ARS RESEARCH FOR THE 21ST CENTURY

Proceedings from the

Stakeholder/Customer Input Sessions

USDA-ARS Laboratories in Dawson and Tifton, GA

March 7-8, 2002, Tifton

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University of Georgia
Tifton Campus Conference Center
Tifton, Georgia

Sponsored by:
USDA Agricultural Research Service
Laboratories in Dawson and Tifton

Table of Contents

Welcome from Karl Narang, Area Director, South Atlantic Area, ARS

Welcome to the ARS Research for the 21st Century, A Stakeholder and Customer Input Session. I appreciate your willingness to participate in this important effort to shape the agenda for the future agricultural research at the ARS laboratories in Tifton and Dawson, GA.

This workshop is designed to gather your input and suggestions for the future directions of the ongoing research in the areas of peanut production, crop genetics and breeding, crop pest control and the Coastal Plain Southeast watersheds. As you may already know, ARS laboratories conduct periodic workshops in conjunction with the development their research plan for specific components of national research programs. The workshops are designed to hear from you in open forum and to gather your ideas regarding future research directions in these important areas of interest to you and your colleagues.

Your input as an ARS customer, stakeholder, partner, or scientist is critical to shaping the future direction of research at Tifton and Dawson and is, therefore, of great value to us. If you are an ARS **partner, customer, or stakeholder,** I charge each of you to be candid and forthright in sharing your thoughts on the future research agenda. If you are an ARS **scientist**, your charge is to listen. This workshop is a special opportunity is hear first hand the research needs identified by the participants. Your creativity, input, and insights will be of tremendous importance in the next stage of the process as we develop and realign our research plans.

It is my hope that the exchange and collaboration during this session will further our working relationships. You will all play a valuable role in shaping the ARS research agenda. The more we communicate with you and you with us, the more successful our ARS program will be overall. This ongoing communication cycle is imperative to our future success and to the future of agricultural research.

Thank you all for taking the time from your busy schedules to be with us during the workshop. Your participation and your ideas are shaping the future of the Agricultural Research Service as we move forward in the 21st century. Work hard! Best wishes for a successful meeting. Once again, thank you.

Purpose of the Stakeholder and Customer Input Session

In keeping with the policy of the USDA Agricultural Research Service's plan to become more responsive to the needs of our customers by directly addressing identified research needs, we invite the customers, stakeholders and partners of the USDA Agricultural Research Service's laboratories in Dawson and Tifton, Georgia to help identify the problems and issues that should be addressed through our research programs at these locations.

We seek advice on the specific partnerships and research endeavors that will make our programs of greatest service in reaching across disciplines, institutions and state boundaries to marry production enhancements with smart urban growth, increased tourism opportunities, optimal water allocations, and improved soil, water and ecosystem quality in the coastal plain.

Overview of Participating ARS Units:

National Peanut Research Laboratory
Dawson, Georgia

The mission of National Peanut Research Laboratory (NPRL) is to develop new technologies to reduce risk and ensure the future of the U. S. peanut industry, while enhancing the quality and safety of peanut products. NPRL research has led to the development of technologies that reduce aflatoxin contamination, aid in irrigation and harvesting, and new equipment - all of which can increase the profit for various segments of the peanut industry and improve peanut quality. Extensive work in computer software development has generated scientifically-derived recommendations to help the industry make valid management decisions to reduce risk and produce a high quality, safe product at a lower price. In many research projects at the NPRL, two valuable sources of information, the industry cooperator and the scientist, are linked combining hands-on experience and knowledge with scientific and statistical data expertise to conduct research. This partnership is essential for development of accurate and practical research information. From basic field experiments to highly sophisticated laboratory studies, research at the NPRL continues to reach new heights. From machinery to microscopes, the goal is the same, to help the peanut industry grasp the future.

Overview of Participating ARS Units:

Crop Genetics and Breeding Research Unit
Tifton, Georgia

The Crop Genetics and Breeding Research Unit conducts research in cooperation with other ARS research programs and University of Georgia and other state research and extension programs to solve agricultural and environmental problems of regional and national interest. To fulfill this mission, the Unit: (1) collects, evaluates, develops, preserves and distributes germplasm with improved biological and agricultural characteristics; (2) develops new and improved breeding methods, genetic populations, breeding lines and cultivars to enhance agricultural production and efficiency; (3) develops new and improved management practices that increase yields, minimizes production and utilization losses, and enhances environmental quality; and (4) develops pest management strategies that are economical, sustainable and environmentally sound. Research is conducted on warm-season forage and turf grasses, maize, peanut, pearl millet and sorghum. The Unit conducts basic, developmental and applied research to establish principles and practices that are transferred to industry.

Overview of Participating ARS Units:

Southeast Watershed Research Laboratory
Tifton, Georgia

Research at the Southeast Watershed Research Laboratory is integrated with other ARS Watershed Research Programs and with state programs at the Coastal Plain Experiment Station. Current work seeks to evaluate the impact of erosion, nutrients, pesticides and pathogens from agriculture on soil and water quality. Specific objectives are to develop: (a) a conceptual understanding of responses in natural resource and environmental systems based on physical, chemical, and biological processes; (b) methodologies to direct optimal use of soil and water resources in the production of quality food and fiber while maintaining short- and long-term productivity requirements, ecosystem stability, and environmental quality; and (c) models and information based systems to guide responsible management decisions at field, farm, and watershed scales. Plans for future research include: (a) mapping and quantifying irrigation water removals within the Suwannee Basin; (b) instrumenting three additional intensive study watersheds within the Suwannee Basin to provide real-time characterization of precipitation, soil moisture, hydrologic flow, and water quality; and (c) coupling this information with research on BMP improvement to evaluate relationships between land use, weather and climate, water quantity, water quality, and the impacts of BMP implementation on agricultural profitability.

Overview of Participating ARS Units:

Crop Protection and Management Research Laboratory
Tifton, Georgia

Research at the Crop Protection and Management Research Laboratory is directed toward development of sustainable pest management systems for southern crops using ecologically based, whole-farm and area-wide approaches that rely on the inherent strengths of our agricultural production systems. Current work is integrated with other ARS research laboratories and with University of Georgia research programs to generate new knowledge, principles and practices for the development of efficient, economical, environmentally sound, sustainable strategies for the management of nematode, weed, disease, and insect pests of agronomic and vegetable crops. Current objectives include: 1. Conduct basic, developmental, and applied research on the biology and ecology of major pests and their natural enemies to develop a better understanding of how they function in and impact agronomic and vegetable cropping systems in the Southeast; 2. Develop integrated pest management strategies based on the inherent strength of our agricultural systems that are sustainable and depend less on agricultural chemicals for the control of nematode, weed, disease, and insect pests; 3. Develop crop rotations, cover crops, trap crops, and reduced tillage systems to reduce pest populations which impact agronomic and vegetable crops grown in the Southeastern Coastal Plain; 4. Determine the influences of landscape ecology on the population dynamics of major pests of southern crops; 5. Develop economic thresholds for weeds, plant diseases, nematodes and insects and integrate these thresholds into expert systems; 6. Identify the mechanisms of resistance to insects, nematodes, and aflatoxin formation in corn, cotton and peanut and develop molecular markers that can be used in marker-assisted selection for resistance.

Address by Dr. David Bridges, Assistant Dean, UGA, Tifton Campus

March 7, 2002

We are indeed pleased to have each of you on the University of Georgia College of Agricultural and Environmental Sciences Tifton Campus. On behalf of the College and USDA-ARS faculty and staff I welcome each of you. This campus is one built on cooperation and partnership, it is home to the Coastal Plain Experiment Station, the UGA Cooperative Extension Service's Rural Development Center, the National Environmentally Sound Production Agriculture Lab, and Veterinary Diagnostic Laboratory. Also, adjacent to our campus is the campus of Abraham Baldwin Agricultural College, with whom we will soon partner to offer a 4-yr agriculture curriculum in South Georgia.

This stakeholder and customer input session is vital for the future of our respective institutions, the constituency that we serve, and the South Georgia community in which we live and work. I appreciate the opportunity to participate in the sessions and to share with you this evening a few of my thoughts about 'our' future.

First, to the Director, South Atlantic Area, Dr. Karl Narang and the national program staff, welcome to the campus. To Paul Blankenship, Wayne Hannah, James Carpenter, and Tim Strickland, who are the Unit Research Leaders, thank you for the invitation to speak. To Jimmy Hill, we welcome you to the campus again and thanks for the important role that you have played in this input session.

First, let me tell you a bit about myself. I am often asked why I welcome visitors by saying 'welcome to south Georgia'. I am often asked, isn't it enough to just say welcome to Georgia. To which my reply is, 'No, that isn't enough'. You aren't just in Georgia, you are in South Georgia. As a native south Georgian I have the God given right to issue the politically correct version – welcome to South Georgia. I was born and raised in Terrell County, Georgia. I grew up in the big city of Parrott, Georgia which is a suburb of Centerpoint, home of Paul Blankenship. My father was a farmer and my mother was a public school teacher. I have been involved in 'agribusiness' since the day I was born. I attended and graduated from ABAC before earning B.S. and M.S. degrees from Auburn. I earned a Ph.D. from Texas A&M University. In 1986 I returned to Georgia and joined the faculty of the University of Georgia, located at the Georgia Station in

Griffin. In July of this past year I assumed the duties of Assistant Dean for the College, located here in Tifton.

About this time your probably asking, why is he telling us this? I tell you this because you know that many times things are not what they appear to be. In my case things are what they appear to be. My passion for and dedication to agriculture and the health of Georgia's rural economy are genuinely the only reasons for being where I am. I will take a few minutes this evening to share with you some of my concerns and thoughts about the future of agriculture, rural economies, and quality of life in the south.

First, did you know that in more than 50% of Georgia's 159 counties 50%, or more, of the county tax base is accrued in agricultural or forestry assets. In 2/3 of Georgia's 159 counties the number 1 or number 2 economic enterprise is agriculture. Agriculture is important to rural Georgia, and equally so to the rural south. Peanuts are more than peanuts in Georgia, but cotton, vegetables, cattle, and other commodities are just as important. Paul Blankenship and Al Breedlove will tell you that in Webster and Terrell County Georgia agriculture is the economic engine – an engine that has been missing on several cylinders for a while and is now about to run out of gas.

Agriculture is so important! We here the Governor, members of the state general assembly, legislators, and anyone else who can get on camera talk about rural economic development. The truth is that the keys to rural economic development are:

- education,
- communication,
- transportation, and
- quality of life

More simplistically to have positive economic growth and development communities must have:

- a skilled workforce (human capital)
- a telephone line,
- a highway or railroad and
- freedom, recreation, and affordable housing.

Without agriculture -- education, communication, and transportation are impossible! Remember our tax bases are accrued in agriculture. You've heard the saying "if it ain't broke don't fix it". I am convinced that in the case of agriculture, "When it's broke, you can't fix it". Most people don't realize that. Agriculture is the most important economic engine in rural Georgia. Were the great basketball coach Adolf Rupp living I suspect that he might feel the same way about

agriculture as he did about the score in a basketball game – it ain't the most important thing – it's the only thing.

So, what does the future hold for agriculture and rural Georgia and what is our responsibility to see that the future is brighter for the next generation than it was for us?

Take a look sometimes as the last two Census' of Agriculture. Compare the two and see what has happened in Georgia over the past 10 years. Every economic indicator is pointing in the wrong direction!

- Net farm income (minus government payments) = down
- debt:asset ratios = up;
- debt:equity ratios = up;
- liquidity = down;
- number of farms = down

Must I go on. It is really sad. Understanding the aforementioned indicators is easily understood when one looks at the potential for profit in Georgia Agriculture. A 1999 study by the Center for Agribusiness and Economic Development at the University of Georgia indicated that out of all our agricultural enterprises over a 10 year period only three enterprises showed a potential for 10% or more return on investment: dryland peanuts, irrigated peanuts, and irrigated cotton. The truth is that almost any investment, even a fixed earning investment over the past 10 years would have been more profitable than farming.

So, where do we go from here. The truth is we aren't the low cost producer on most commodities and no amount of innovative research is going to change that. Every week more and more reports tell of the vast acreage in Argentina and Brazil that will go into commodity production over the next 2 to 5 years. Contrary to popular opinion the Corn Belt is not our competitor any more.

To regain profitability we must do more. We often fall into the trap of not being able to see the forest for the trees. Positive economic development requires profitability. In general, to be profitable one uses financial assets to convert a resource, or multiple resources, into a product whose value greatly exceeds the value of the inputs. If you want to borrow money to start a business the first thing the banker will ask is what assets and resources do you have and what is your business plan.

Rural Georgia has two resources. Anyone want to guess what they are? They are land and water! Almost every day I hear leaders engaged in economic development talk about attracting manufacturing or technology industries. The truth is we don't have sufficient educated and skilled labor forces nor the transportation infrastructure to support technology and manufacturing. The cut and

sew plants are gone. Besides these industries can't capitalize on the resources we have – land and water. What we need is a business plan for the land and water. In short, it's not about farming – it's about how to make a return on investment on the land! It is the economy stupid – and in South Georgia and throughout much of the rest of the rural south the economy is agriculture.

So, how do we use the agricultural and natural resource research and extension assets that we have to bring about the change that is essential? Historically we have focused on how to grow more at a lower cost. We have invested in plant and animal genetics programs, plant and animal production programs, pest management programs, and soil, water and air research programs. While these programs are important they can no longer along assure economic viability of southern agriculture.

The University of Georgia and USDA-ARS are well positioned to make a real contribution to paving the way for a profitable agriculture that will contribute to the sustained economic viability in our state and region. We have the component research programs. You were briefed this afternoon on these programs. What we haven't done, but what we must do is develop a strategy to address the larger, landscape issues that will insure economic viability and environmental quality for the future.

The question is, "How do we integrate our genetic, production, pest management, natural resource, and economic research programs in a way they move us toward an environmentally responsible and profitable agriculture. Briefly lets look at what we have to work with:

1. We have a collaborative program – UGA and USDA are staffed with the best human capital. Between us we have some of the brightest and most creative scientists in the state, nation, and world.
2. We have tremendous infrastructure – if you have time tomorrow visit the campus, our farms and facilities, and the lab in Dawson. I think you will be amazed at what we have to work with. Could we use more? Yes, but we are quite fortunate.
3. Support – both the State and Federal programs are well funded. Granted we whine and complain, but the truth is we are more fortunate than many other states and facilities.
4. Opportunity – most importantly we have almost unlimited opportunity.

Not to dwell on the past or the present, but let me highlight a few shining examples of our (note I said our) success:

Fully Integrated Efforts – Crop Genetics and Breeding is a well-integrated program, dating back to "Cowboy" Stephens and Glen Burton, and continuing with Wayne Hannah, Corley Holbrook and others. The program has been a model for success. ARS and State scientists have worked together seamlessly. They have been jointly housed. The program is horizontally and vertically integrated. The faculty work shoulder to shoulder. Good examples: Wayne Hannah and Peggy Ozias-Akins. Corley Holbrook and the Tomato Spotted Wilt Virus Team.

The program is vertically integrated in that from basic genetics, to germplasm, to cultivar development, to production on the farm when the improved genetics is ready to be implemented there is a complete package --- one that is ready for Extension to deliver. I can't say that I've ever seen it work better than with this Unit. Great things have come from this collaboration in the past and I expect them to continue in the future.

State and Federal Programs within the other 3 units are sometimes equally well integrated. Sometimes they are more complementary than they are integrated. For example SE Watershed work in the area of hydrology, water quality, and riparian ecology has complemented State water quality, animal waste, and pesticide programs. However, I have great hopes for the future. I believe that much of the work on the value of riparian buffers and other natural features of landscape for damping the potential impact of agricultural practices on the environment is just now being recognized. To Richard Lowrance I would say, sometimes people are just ahead of their time. I have great hopes that scientists at NESPAL and SE Watershed and others will be able to lead us toward a bright future in optimizing and fine-tuning the landscape of a farm so that profit, environmental protection, and quality of life will all be maximized. Precision in agriculture will mean the difference in profit for the future.

The Tifton Campus is blessed with a cadre of highly respected scientist in the area of pest management – some are UGA faculty and many others are USDA-ARS scientists. Speaking from more than 15 years of personal experience I can tell you that there is a high degree of collaboration between state and federal scientists in the pest management disciplines.

The National Peanut Research Laboratory, originally created to conduct research on post-harvest processing and mechanization on peanuts, now has research programs addressing all aspects of peanut production. The have played a major role in the development of expert systems relative to farm enterprise and irrigation management. Likewise, the University of Georgia has been and remains

heavily committed to research and extension programs for what has traditionally been Georgia's most valuable crop. We anticipate the development of stronger collaboration between the two programs.

Where do we go from here? I really believe that our challenge is to develop a common agenda and a unified approach. We can do more together than we can apart and we truly do each serve the same clientele.

USDA-ARS has had an indelible impact on the Tifton Campus. They have contributed to the world-class research effort that has brought notoriety to Tifton for going on 100 years. But, USDA has meant more than this. The people have added to quality of life. They have also been a source of humor, wisdom, and friendship. I leave you with a few quotable quotes from distinguished ARS scientists, I'll give you a chance to guess who they were:

"We haven't learned the best way to do anything yet!" - Glenn Burton

"He was buried in a "Gaucho" outfit with a pistol in hand and first to be buried in a field cemetery on the family farm. He was a unique and interesting individual as one may surmise from the epitaph on his tombstone, which read",

"He was kind to horses and
loved little children,
He never hit a man who was down
"Cowboy Stephens"

Cowboy worked with one of our early scientists "Red" Parham who said, among other things:

1. two movings is worth one burning
2. you will have to lick that calf again
3. he who panics is lost
4. education is always in a crisis
5. we have jumped that rabbit before
6. the agronomy dept is organized as a loose confederacy
7. everything I eat has been attacked by someone
8. he has his tail in a crack, I expect we'd better lend him a hand..

So, the relationship between UGA and USDA has been great. It has been productive, stimulating, mutually beneficial, and at times down right entertaining. I look forward with great anticipation. We must believe that the best of times are yet to come. Else, we are destined to the prospect of a miserable future. The prospect of a miserable future will most likely lead to just that. So, we should plan for and anticipate the best.

Remarks by Jimmy Hill, President, The Hill Group Inc.
Session Facilitator

The following instructions were given to Breakout Group Facilitators:

Your role as a facilitator is to keep the process moving and stay on subject and on time.

Breakout Group Goals:

- Review research programs
- Determine gaps (if any) in current research
- Determine stakeholder needs
- Seek out emerging areas of concern
- Determine priority areas of cooperative research

Facilitator Action Plan:

- Bring the group to order as quickly as possible
- Ask everyone to introduce themselves and facilitate this process quickly so the group will have plenty of time to accomplish its goals
- Select a recorder ... someone to input the groups responses into the laptop
- Select a presenter ... someone to report the groups responses at the Plenary Session
- Be sure to stay on time ... you have 75 minutes to complete this process
- After you complete your assignment, but not later than 9:30 a.m., please escort your group back to the Plenary Session
- Have your presenter ready to report the group's responses at the Plenary Session

Thank you for assisting in this capacity!

Breakout Group Report

National Peanut Research Laboratory

What are stakeholder needs

- Level playing field for growers for competition in world market
  - Subsidies are provided by other countries for their agriculture
  - Same product in other country costs less than in U.S.
    - Chemicals
    - Equipment
- Input costs are higher than for international competitors
  - Labor
  - Chemicals
  - Seed
  - Equipment, etc
- Peanuts not only crop (whole farming operation)
- Food safety concerns of imported agricultural commodities
  - Different chemicals allowed in foreign markets that are not allowed in US
  - Capitalize on concerns of origin of commodities – Legislation pending in new Farm Bill regarding origin labeling
- Need for increased collaboration
- Sustainable production practices (proper uses of natural resources)
- Effects of new farm bill
  - How is quality going to be measured and accounted for in sale of commodities
  - Price discovery
  - Grading and marketing, premium & discounts for quality factors
  - Handling risk during "bad" years
  - Aflatoxin
- Better transfer/adaptation of technology
- Storage capacity
  - Increased on-farm storage
  - Increased number of cooperatives
- Peanut allergy
  - Science
  - Public relation issue

- Irrigation research
    - Alternative methods
- Improved communication of research
    - Demonstration plots
    - ARS/Extension/Industry partnerships
    - Improved Websites
- Scaling up
    - Small plot
    - Commercial application of small scale research
    - Develop scale up technology
- Stretch the boundaries of conventional thought
- Cost/benefit of inputs vs. final profit
- Maximize profits vs. maximize yield
- Water management
- Tell the success stories
- National focus of research
- Seed quality
    - Mechanical damage during shelling & handling
    - More vigorous seed
    - TSWV + other disease resistance
    - New varieties development

Priorities for collaborative partnerships

- University of Georgia partnerships
    - Has not been where it should have been
    - Priority on improving collaboration
    - Improve collaboration of university researchers
- Become pusher of information
- Regional partnerships
    - FL, GA, AL
- University partnerships
    - Auburn
    - Univ. FL
    - Va. Tech
    - NCSU
    - Texas A&M
    - Oklahoma State Univ.
    - New Mexico

- Improved communication lines between ARS and extension
- Improved communication to smaller producers
- Collaboration on Water use/capture
- Target young farmers

Breakout Group Report

Crop Genetics and Breeding Research Unit

Corn

- Maysin – Flavanviod – Cooperative to Present
- Needs – Chemistry
  - 2-10% dry weight silk
  - Analysis – sample
  - Gene markers
  - ‹ 10,000 samples total/year
- Southern (sweet) dent corn – commercial varieties, improved
  - Non-transgenic resistance to corn ear worm
  - Must combine with "tight" husk trait
  - Aflatoxin (critical need to address) – industry… no attention
  - Fusarium (fumonisin) – major industry focus
  - Correlation between Aspergillus and Fusarium – field problem versus storage

Crop Rotations

- Cotton
  - Need systems to compliment cotton
  - Two crops now – need diversity with cotton/grasses – irrigation
  - Improve quality of cotton (short fiber is a problem)
- Pearl Millet
  - May be an important crop in rotation system
  - Drought tolerance/water conservation
  - Model expert system
  - Double crop or duplicate crop millet
- Market development
  - Organic grain – production… business plans

Peanuts

- Forage niche market – organic
- Natural pest – disease and weed resistance
- Organic cultivar – demand is present… need connection with market

- Communication
- Credibility
- Germplasm release procedure… need marketing plan
- Need analytical lab
- Workshop

Needs

- Analytical lab – chemistry partner in process
- Aflatoxin – Fumonisin
- Seed composition
- Maysin
- Allele specific marker for peanut disease and nematodes

Breakout Group Report

Southeast Watershed Research Laboratory

Major Issues

A. TMDL implementation tools (User models/tools)
B. Lack of hydrologic water quality and biological data and indicators
C. BMP's performance for all sectors (agriculture, urban small industry, etc.)
D. Regional information for public and private entities
E. Water Use

Major Gaps

- Local governments need new approaches for TMDL's to compile to laws for an implementation program
- Methodology – are we measuring the right thing and do we have tools to measure things
- Is there a regional data clearing house information on TMDL's? Where do we go? – related to Issue A
- Have data in form that could be understood by the public – related to Issue A
- BMP's to control runoff from new and existing subdivisions to help water quality – These are Phase II rules on development on › 1 acre for runoff control – related to Issue C
- Urban/suburban problems similar to or moving towards production agriculture issues. How do we do both? – related to Issue C
- Better prediction tools – risk management… fate and transport
    - Will BMP actually work?
    - Help for USDA to predict consequences – related to Issue C
- Need models for both regional and local development to answer questions… module format for plug and play models for different scales – related to Issues A & C
- Need better BMP's for CAFO's – cost effective and environmentally effective:
    - What are appropriate buffer areas "lengths" based on soils-slopes rainfall?
    - What are appropriate application rates?
    - How do you quantify reductions so you can trade TMDL's from BMP's for point and non-point sources?

- What are the load predictions and associated reductions that are needed so can work more effective? – related to Issue D
- Groundwater recharge and interaction with surface water to address TMDL's – related to Issue A
- Water supply – What are the withdrawal rates? – related to Issue E
- What are potential impacts of more use of water or more frequent droughts – related to Issue E
- Water quantity issues on groundwater: – related to Issue E
    - Information and education – then how to do incentives to change to improved water use efficiently (cost share funds)
    - Need integration of all pieces to put into a model – changes from fields to city subdivisions
    - Need appropriate data so models can be developed and validated – integrated databases and metadata for all sectors of water uses… city, agriculture, industry, etc.
    - Must be regional by nature for all watersheds
- Irrigation use efficiency – how well is water at being used? – related to Issue E
- Limited ground water data: related to Issue B
    - Can't predict amount of groundwater if no data is available
    - Need data to develop model output
    - Need validation and development
- Need user friendly tools for all users – related to Issues A, C & D

Breakout Group Report

Crop Protection and Management Research Laboratory

Research Gaps

- Production
  R & D for Systems Other than Industry Driven
- Whole farm management that integrates all components (cover crops, riparian areas)
- Crop rotations – how does each crop affect the next?
- Need new crops for the Southeast
- Irrigated vs. dry land (need research for each type of production)
- Improved rain water usage
- Improved water holding capacities of soils
- Tillage practices (e.g. strip till) – impact on soil compaction – integrate tillage knowledge into production systems
- How to use machines without destroying soil quality
- Diversification of farm production and synergies of components
- Ability to implement what we know
- Post harvest management – crop protection beyond field (capture and maintain value of crop with new knowledge and techniques). Link farm practices from planting through processing.
- Extend what is done in research unit – find partners – extend system
- Transfer of information/technology to growers – conduct on-farm research
- Use a holistic, ecologically-based system on farms
- Researchers should be required to visit farms with county agents to learn more about farm needs
- Need information concerning land management post-harvest to complement next year's crop
- Problem of farmers getting accurate information
- Need to get information from production systems in other geographical locations.
- Detection, eradication, prevention technologies to deal with new and/or exotic pests (diseases, insects, weeds).
- Agricultural economic components are needed
- Vegetable crop research is needed

Summary Session Report

- A desire was expressed for more collaboration between UGA Tifton Campus and the Southeast Watershed Laboratory
- Websites (UGA, ARS, etc.) need to be more user friendly, with enhanced search engines and with research information on line
- Grower groups need to advise each lab on research needs with emphasis on specific local input
- Grower demonstrations "on farm" will enhance grower acceptance of research data
- Getting the research information implemented (transferred) to the grower is the key
- There is a collaboration concern regarding the Cooperative Extension Service
- There is also a lack of collaboration at the research level as well
- We need more involvement between USDA/ARS and the UGA faculty in research and extension
- It is important to note that UGA has the means to transmit research information to growers and other interested parties
- A two-way street exists between ARS and UGA… effort and attitude will enhance communication and cooperation
- Getting research information out is most critical and the posters presented at this conference need to be available to all attendees
- A critical issue in addressing farm issues is to consider whole farm ecosystems and mobilize resources to address the holistic needs
- Communication is central to success in conducting and assimilating research information and finally in transmitting it to the ultimate user. Websites must be developed by issue and include yield per acre data
- We must gather more farmer/grower input information. We must address how to move information to reach the general farm population. Are we capturing research information and transmitting it to farmers?
- We must help develop profitable systems for agricultural production… systems not just data!

- Applied research needs to provide opportunities for farms to make a profit
- Farm profitability encompasses customer demand and seizing market opportunities. We must help identify products with strong demand.
- Why do we want to do more of the same old thing (increase production of a commodity and get less money for it)?
- Pearl millet is a good example of a commodity that has lots of potential for our southern farmers
- We need to research and solve the aflatoxin problem so we can market our commodities as aflatoxin free
- We need to do more research on forage fed beef including grasses, drought and pest resistance
- Water will continue to be a major issue and needs to be a top priority for all involved
- Don't limit customers (water users) to just farmers but include the general population, cities and suburban areas as well as industries
- Mentor programs in organics and grass fed livestock
- There is a collaborative effort with the Florida A&M Water Quality Center and ARS scientists. Whole farm issues, vegetables, weeds and evasive species are being addressed.
- We need to do more with on-farm processing of commodities for further value added opportunities for the grower
- We need to continue to look for more value added opportunities for other types of production systems
- We need to consider how to increase communication between the farmer and the processor. Processors need raw product and the farmer produces the product… sometimes opportunities are lost for lack of quick and responsive communications
- We need better interpretation of information… multidisciplinary teams can be used to interpret and communicate issues to the grower and others
- USDA/UGA research proposals are excellent compared to other states
- Aflatoxin issues cross over into all areas
- We need to focus on a systems approach to address issues and economics
- We need a whole farm approach to address issues and to optimize crop production systems

- Economic research must address the bottom line costs/profits of the farmer. We need to use yield per acre/dollar per acre as the way to express impacts
- Conservation of economics (value) to the farmer must be emphasized
- ARS cannot hire economist because of federal guidelines and we need them desperately
- Five or Six economists are at the UGA Tifton campus now and they do collaborate effectively. Florida A&M also has economists on their faculty
- ARS has on-farm research underway and it is multidisciplinary

Legislative Session

- Comments from Legislative Aides: Debbie Cannon, Representative Saxby Chambliss Office, Jody Redding, Senator Zell Miller's office, and Thomas Daniel, Representative Sanford Bishop's office.
- We need better communication between research groups, farmers and others … we need a good communication tool
- Our research goal needs to be to maximize profits for farmers (not necessary improving yields) but to increase the farmer's net profit
- We need to work on value added issues for farmers
- We need to work on water, tillage, disease issues as well as pest resistance
- We need to work on vegetation and weed management
- Collaboration is very important … we need results and we don't need to duplicate services and products
- There has to be an economic incentive for farmers
- We need to do more direct help projects, for example, the Georgia Department of Agriculture's fruit and vegetable promotion this past year
- Websites are great tool … but they must be updated frequently to be useful
- US Production agriculture is not on a level playing field with other countries
- Profitable farming operations are most important issue
- Agriculture is important … farmer must have a profitable bottom line
- Communication is very important between ARS and UGA
- We don't need to duplicate research and other efforts … for example Georgia is constructing a micro gin and Mississippi is as well … do we need both?
- We need to use the KISS principle … Keep it simple Scientist. We need one page summary proposals not twelve pages.
- We need to come back and revisit these issues once a quarter … USDA/ARS/UGA needs to do more collaboration on issues
- We need to explore new crops/products such as organics … diversified farming operations are very important here in the southeast
- Food needs to be looked at as a national security issue
- We need to stay aware of food production issues outside of the US

Where do we go from here?

Mr. Donald Erback, USDA/ARS, NPS made the closing statement.

Thanked the group for their time and the sharing of ideas and suggestions for each of the four areas addressed during the session.

ARS program development will address these issues as a part of their strategic planning effort

Customers/stakeholders need to remain engaged and stay in touch with research programs

You can influence priorities by attending these kinds of sessions, communicating with ARS administrators, and congress

The economist issue, which was discussed during this session, is currently being addressed at ARS

We appreciate your response to our presentations, reports and posters

We look forward to partnering with you even more in the future

Please visit our web site at ars.usda.gov

Again, thank you for your time and ideas shared during this stakeholder and customer input session

Appendix A – Session Agenda

Thursday, March 7, 2002

12-1:00 PM	Registration
1:00-1:20	Welcome and Introduction of the Workshop Facilitator and National Program Staff (Karl Narang, Area Director, South Atlantic Area)
1:20-2:15	Overview of National Peanut Research Laboratory (Paul Blankenship, Research Leader)
2:15-3:10	Overview of Crop Genetics and Breeding Research Unit (Wayne Hanna, Research Leader)
3:10-3:30	Break
3:30-4:25	Overview of the Southeast Watershed Research Unit (Tim Strickland, Research Leader)
4:25-5:20	Overview of the Crop Protection and Management Research Unit (Jim Carpenter, Acting Research Leader)
5:30-7:00	Dinner with Invited Speaker (David Bridges, Assistant Dean, UGA, Tifton Campus)
7:00-9:00	Poster Sessions on Active ARS Projects at Tifton and Dawson

Friday, March 8, 2002

8-8:15 AM	Introductory remarks about Breakout Groups (Facilitator)
8:15-9:30	Four Breakout Groups to review research programs for each unit. Gaps in current research; Stakeholder needs; Emerging areas of concern; Priority areas for cooperative research
9:30	Plenary Session
9:30-9:45	Report of Breakout Group 1
9:45-10:00	Report of Breakout Group 2
10:00-10:30	Break
10:30-10:45	Report of Breakout Group 3
10:45-11:00	Report of Breakout Group 4
11:00-12:00	Summary Session - Facilitated discussion among all four groups to make recommendations for collaborative programs
12:15-12:45 PM	Comments from Legislators/Staff (Invited)
12:45-1:15	Synthesis… Where do we go from here? (Karl Narang, Area Director, South Atlantic Area, USDA-ARS and David Bridges, Assistant Dean and Director of the CPES, UGA)

Adjourn

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Appendix C – ARS Poster Boards

IRRIGATED AND NONIRRIGATED RESEARCH

USDA ARS

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D.L. Rowland, Ph. D. Plant Physiologist
R.B. Sorensen, Ph. D. Agronomist/Soil Scientist
D.A. Sternitzke, Ph. D. Agricultural Engineer
H. Zhu, Ph. D. Agricultural Engineer

National Peanut Research Laboratory

Sprinkler Irrigation

Shellman Multi-Crop Irrigation Farm

Objectives

- Determine economic impacts of irrigation methods (pre-harvest and post-harvest) in constrained and unconstrained water scenarios.
- Examine profitability of cropping systems (short and long term).

Hooks Hanner Environmental Center

Objectives

- Determine optimal amounts of water to maximize yields and profits of selected crops for conventional and conservation tillage systems.
- Identify the most profitable tillage system for a multi-crop system.

Subsurface Drip Irrigation

Locations

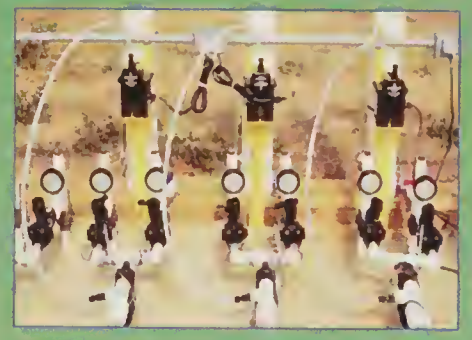
- Sasser, GA
- Shellman, GA
- Seminole, TX
- Clovis, NM

Subsurface Drip Objectives

1. Long term yield and peanut quality
2. Best management practices
3. Long and short term economic returns

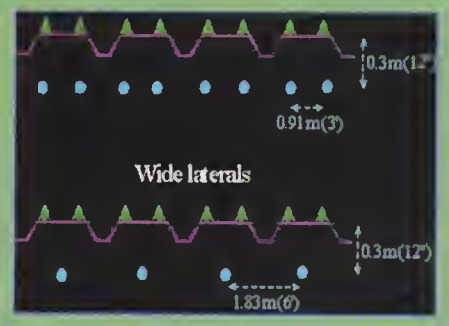
Research variables

- Crop rotation
- Drip tube lateral spacing
- Irrigation strategies
- Fertilizer practices
- Row orientation/Seeding rate
- Tillage practices



Collaborators

Auburn University
J. Leek Associates, Inc.
New Mexico Peanut Research Board
New Mexico State University
Texas A&M University
Texas Peanut Producers Association
Western Peanut Growers Association
University of Georgia



Surface Drip Irrigation

Objective

- Develop and transfer a simple, affordable, and profitable surface drip irrigation system into peanut production.

Research Activities

- Determine the optimum system design.
- Develop application equipment and methods.
- Determine the optimum irrigation schedule for peanut production.

Nonirrigated

Mathews Research Farm

Planting Pattern Study Objective

- Optimize seeding rate and planting pattern to maximize net farm income

Rotation Study Objective

- Identify peanut variety, rotation sequence, and cultural practice input level needed to maximize net farm income

CROP PRODUCTION OVERVIEW

K.S. Balkcom, Ph. D. Agronomist

M.C. Lamb, Ph. D. Agricultural Economist

D.L. Rowland, Ph. D. Plant Physiologist

R.B. Sorensen, Ph. D. Agronomist/Soil Scientist

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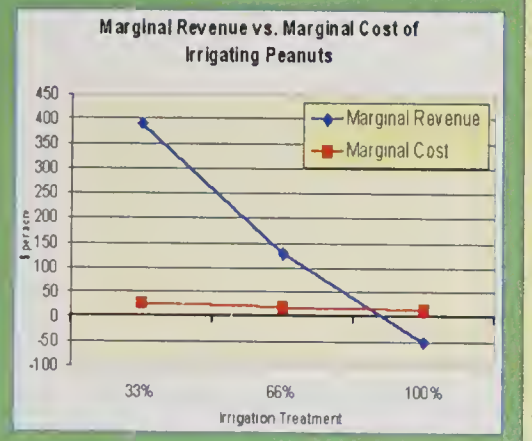
Applications of technology to promote efficient production

Irrigation Economics



Economic Comparisons

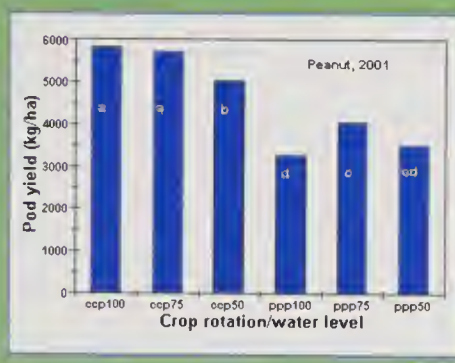
- Optimal use of water resources is critical to maintain producer and industry competitiveness
- Current research is aimed to assist growers in making these optimal decisions given the uncertainty of future water availability
- First-year results show that maximizing yield does not always lead to maximum profit
- Inefficient use of irrigation can be seen when increasing yield overshadows maximizing profit

Tillage / Irrigation Interactions

Conservation Tillage Systems

- Crop residues present on the soil surface help to reduce erosion and conserve moisture.
- Little information exists on how much water can be conserved for growers utilizing conservation tillage practices.
- Amounts and/or frequency of irrigation applications should be lower for conservation tillage systems.
- Lower water requirements will help preserve water resources while lowering production costs.

Subsurface Drip Irrigation

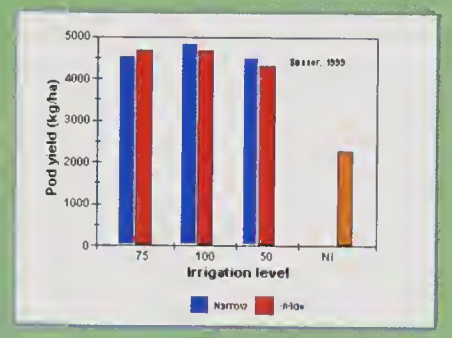


Crop Rotation Comparisons

- Higher pod yield with longer time between peanut rotations.
- Lower pod yield with less water, but not higher pod yield with more water.
- No pod yield difference with lateral spacing.
- Higher farmer stock grade with longer rotation.

Crop Yield Comparisons

- SDI had higher pod yield than NI.
- No yield difference between irrigation levels.
- No pod yield difference between lateral spacing.

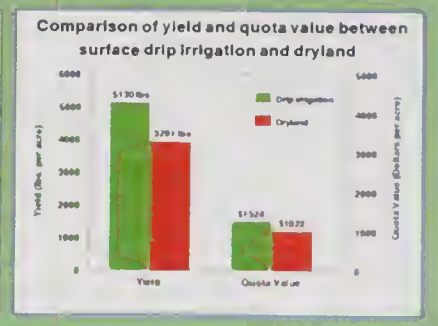


Surface Drip Irrigation

Potential Benefits

Since drip tapes are installed on the soil surface, this system could benefit small farm operations, regular and irregular sized fields, and short term production on leased or rented land.

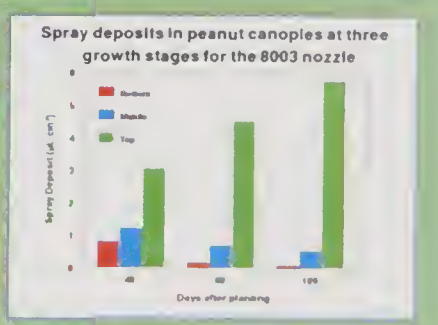
Advantages: Lower initial investment; lower pumping costs; less water use.



Pesticide Spray Application

Strategies

Discover proper pesticide spray methods to improve spray application accuracy and reduce the expense of disease control for peanut production.



CROP PRODUCTION TECHNOLOGY

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Applying new technology to enhance crop production

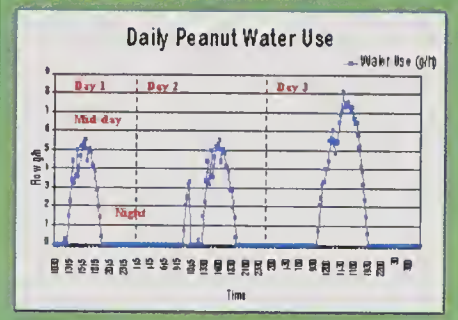
Row Pattern Comparison

Diamond Planting Pattern Advantages

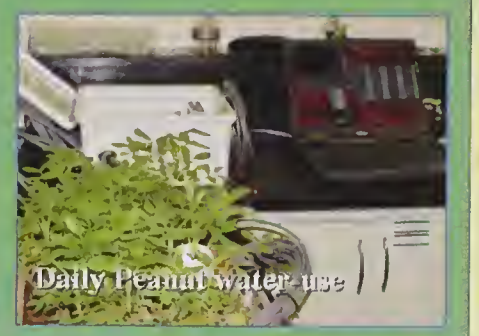
- ✓ Higher yield
- ✓ Accelerated canopy coverage of seed bed reduces:
  - Soil-water evaporation rate
  - Transpiration rate
  - Weed propagation and herbicide need
  - Soil temperature extremes
  - Soil erosion

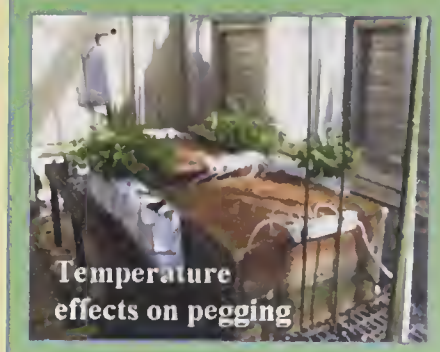
Physiology

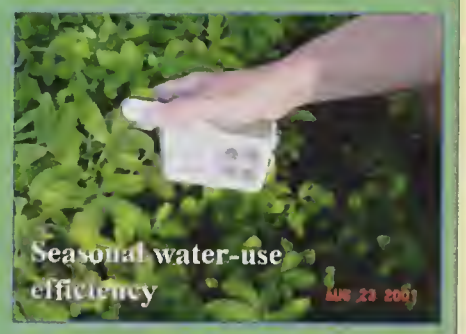
providing solutions to production problems through knowledge of plant function




Water flow gauges


Daily Peanut water-use


Temperature effects on pegging


Seasonal water-use efficiency

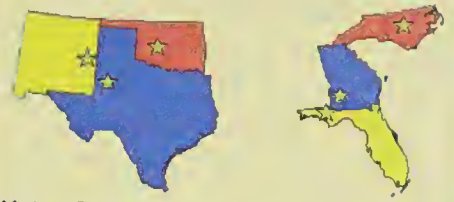
Ongoing Projects

•Daily Peanut Water Use

Water use in response to irrigation type, management regime, and tillage

•Water-use efficiency

Evaluate varieties grown in different regions and determine the effects of genetics and environment



•Water Sources

Determine the amount of water used from precipitation, drip application, and sprinkler application using oxygen and hydrogen isotopes

•Peg water movement

Changes in seasonal water movement through the peg to the developing pod

•Pegging temperature

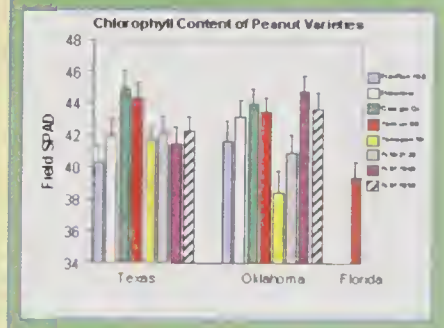
Determine optimum temperature and soil moisture needed to increase pegging success and pod yield

•Water-use curves

Generate seasonal water-use curves for commonly grown varieties

•Aflatoxin contamination

Determine the physiological cues that are correlated with aflatoxin contamination



EXPERT SYSTEMS FOR THE US PEANUT INDUSTRY

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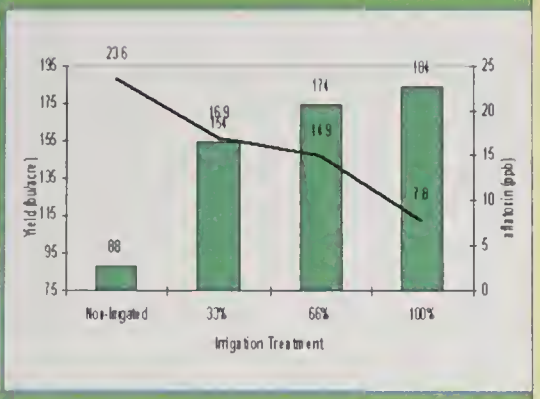
FARM SUITE is a broad suite of software designed to improve decision making for the US peanut industry.

A CRADA (Cooperative Research and Development Agreement) has been established with The Peanut Foundation to expedite release of Farm Suite.



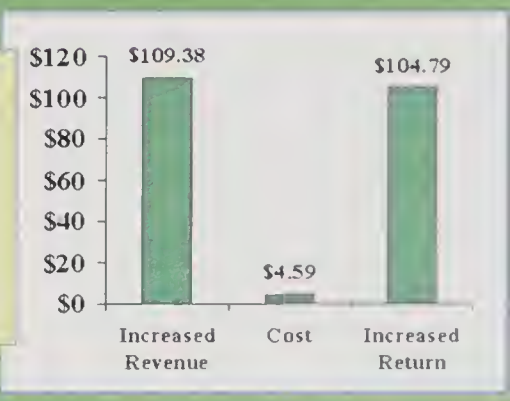
CORN AFLATOXIN MANAGEMENT SYSTEM (CAMS) is a software package that integrates management, production, and economic information designed to assist corn growers in making decisions that maximize profit and minimize risk of aflatoxin contamination. A collaborative effort of the USDA-ARS CGBRU & USDA-ARS NPRL.

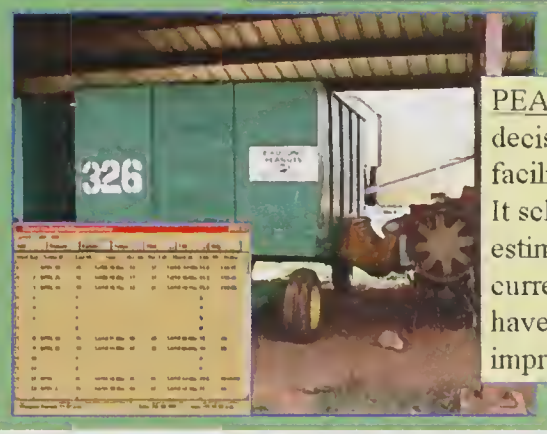
FARM SUITE is a whole farm planning system designed to optimize farm and financial planning decisions by developing formal farm plans specific to each field & farm operation. The whole farm planning system serves as the umbrella for other applications to ensure that recommendations are economically feasible.

DRYLAND PRO is an expert system designed to minimize economic risk incurred in non-irrigated peanut production.

HARVPRO is an expert system designed to assist the user in determining the optimum harvest date by evaluating plant, soil, and weather conditions prior to harvest.

IRRIGATOR PRO is an expert system designed to manage peanut irrigation and pest management decisions to improve economic returns for irrigated peanut production and reduce risk associated with aflatoxin, foreign material, immaturity, off-flavor, chemical residues, and negative environmental impact.





PEANUT CURING MANAGER is a decision support system that assist drying facility managers with inventory control. It schedules sampling and removal times, estimates time remaining on dryer and current moisture content. Cooperators have reported reduced drying costs and improved peanut quality.

PREVENTION OF MYCOTOXINS IN PEANUTS

J. W. Dorner
Research Microbiologist

B. W. Horn, Ph.D.
Research Mycologist

V. S. Sobolev, Ph.D.
Research Chemist

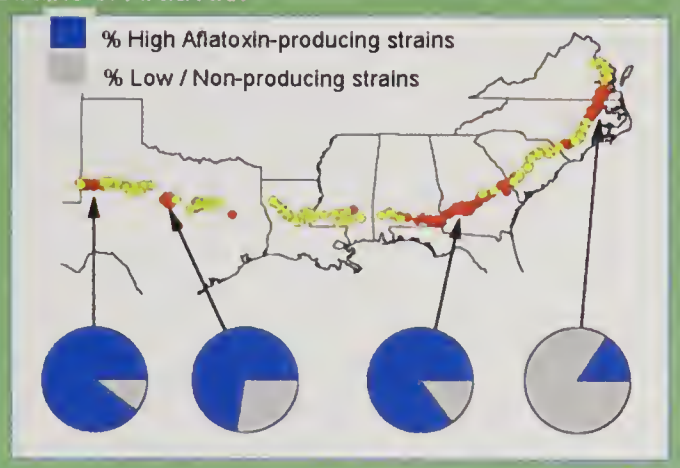
National Peanut Research Laboratory

Problem: Aflatoxin contamination of peanuts is a food safety concern and major economic burden for the peanut industry.

Biological Control of Aflatoxin Contamination

Regional Differences in Presence of Toxigenic *A. flavus*

A transect across the U.S. showed that regions having severe aflatoxin outbreaks are dominated by toxigenic strains of *A. flavus*.

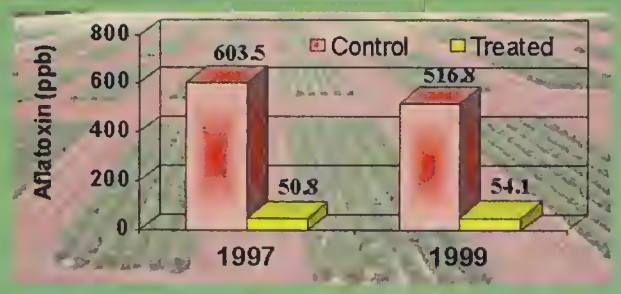


Biological Control: Replacing toxigenic *A. flavus* with non-toxigenic strains in the field

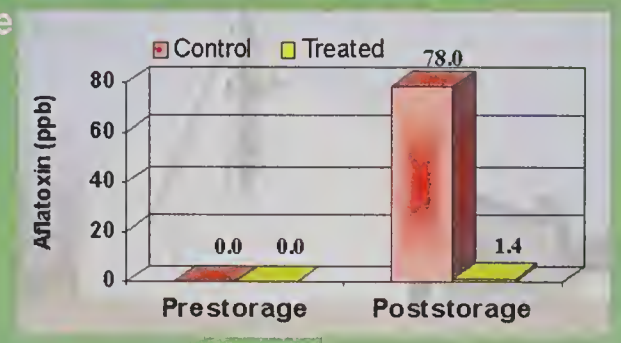
- Vermiculum barley coated with spores of non-toxigenic *A. flavus*
- Coated barley applied to peanuts about 60 days after planting
- Non-toxigenic *A. flavus* sporulates on barley surface and inoculates soil

Aflatoxin Reduction

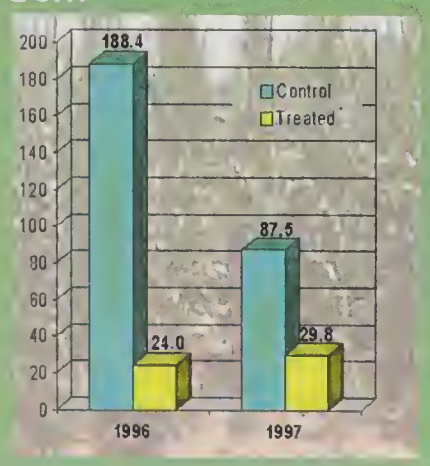
Field



Storage



Corn

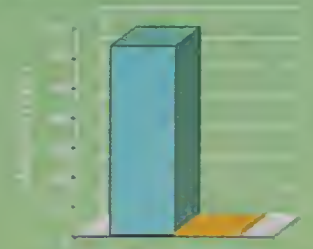


Status
An application to license and market the technology is pending.

Development of Resistant Varieties

Drought tolerant breeding lines are screened to identify those most resistant to aflatoxin contamination

Seed from the most promising lines are increased, and retested



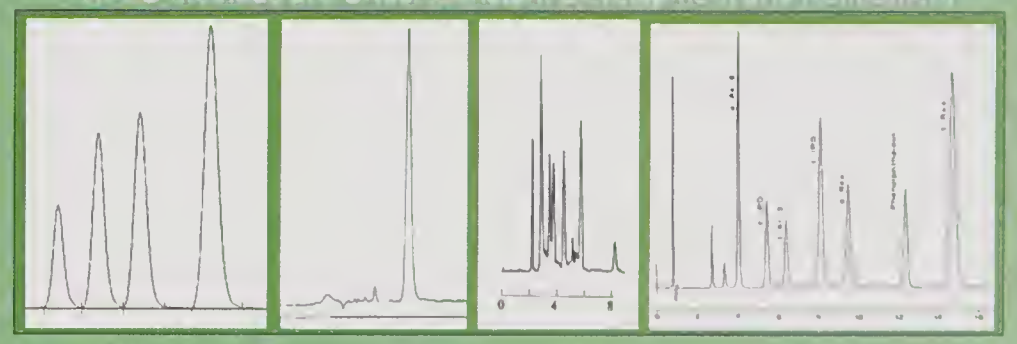
In 2001, one line contained an average of 9.8 ppb of aflatoxin compared with 639.6 ppb in Florunner, a 98.5% reduction.

Collaborator: Dr. W. D. Beavis

Development of Analytical Methods

Accurate analytical methods are necessary for the determination of aflatoxin, other mycotoxins, and other natural products associated with peanuts.

HPLC Methods are Under Constant Development and Refinement



Aflatoxins | Cyclopiazonic Acid (CPA) | Secondary *A. flavus* metabolites | Peanut Phytoalexins

MAINTAINING PEANUT QUALITY DURING POSTHARVEST PROCESSING

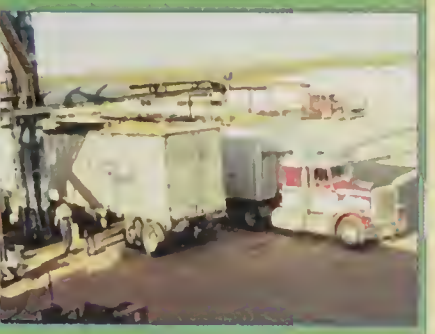
P.D. Blankenship
Agricultural Engineer

C. L. Butts, Ph.D.
Agricultural Engineer

C. Kandala , Ph.D.
Agricultural Engineer

National Peanut Research Laboratory

Vision: Develop sensors, controls, and processes to reduce the costs and risks associated with purchasing, transporting, storing, and processing U.S. peanuts.



Peanut Cleaning, Curing & Storage

Goal: Develop and test new cleaning, curing and storage systems to maintain peanut quality during postharvest processing.

Accomplishments:
- Developed systems for curing peanuts in semi-trailer sized batches
- Determined effect of continuous flow systems on peanut quality
- Tested aeration systems for farmer stock storage
- Developed algorithms for automated temperature control

Impact:
- Semi-trailer dryers common in southeast & southwest.
- Parameters for operating continuous flow dryers developed
- Aeration systems reduced shrink and aflatoxin contamination in storage
- Automated control systems using algorithms available

Future Research:
- Develop control criteria for aeration/ventilation systems
- Determine impact of peanut maturity/variety on curing characteristics
- Develop curing methods to minimize single moisture variation

Quality Measurement and Sensor Development

Goal: Develop sensors and standard tests to objectively quantify peanut quality for marketing and processing.

Accomplishments:
- Developed comprehensive seed testing laboratory
- Developed automated system to extract official grade sample
- Developed automated system to collect and interpret grading data
- Developed methods to grade and market peanuts at high moisture

Impact:
- Independently measure & report physical and shelling properties of peanut
- Consistently extract sample and reduce labor requirements for grading
- Reduce labor & increase for recording and transcribing peanut grade data
- Fundamental change in marketing and handling individual lots of peanuts

Future Research:
- Develop handheld sensor to measure peanut moisture content
- Develop sensor to measure peanut hull brightness for in-shell market
- Develop objective tests to measure maturity, flavor
- Develop sensors and control systems for roasting and blanching

Collaborators:
- A. Ertas Texas Tech University
- E. J. Williams, University of Georgia
- DeLeon Peanut Company Lamesa, TX
- R. L. Cunningham and Sons, Quitman, GA
- Belt-o-matic, BNW Industries, Mentone, IN
- Peerless Manufacturing, Shellman, GA
- Advanced Drying Systems Gainesville, FL
- Microtherm, Inc., Gainesville, FL
- American Peanut Shellers Association
- D. L. Rowland, Physiologist, USDA, ARS, Dawson, [illegible]
- T. H. Sanders, Physiologist, USDA, ARS, Raleigh, N[illegible]
- T. B. Whitaker Engineer USDA, ARS Raleigh, N[illegible]
- USDA, ARS, University, and commercial breeders
- S. O. Nelson, Agricultural Engineer, USDA, ARS, [illegible]
- Golden Peanut Company, L[illegible]
- Birdsong Peanu[illegible]
- Amadus Industrie[illegible]

USDA-ARS Crop Genetics & Breeding Research Unit

Forage and Turf Research Component

Conducted in cooperation with the University of Georgia, College of Agricultural and Environmental Sciences, Tifton Campus

Mission:

Develop superior warm season forage and turf grass germplasm and cultivars,with associated management strategies, and transfer the products of the research to commercial settings.

Importance of warm-season grasses:

Warm-season perennial grasses are the dominant vegetation of grazinglands in the lower two-thirds of the Southeastand form a mixed mosaic with cool- season perennials in the remainder of the region. 25 million acres of grazinglands in the lower South (excluding Texas and Oklahoma) support 1 million dairy and 8 million beef cows. Productive, nutritious annual and perennial forage grasses are the foundation for livestock production and environmental stability.

High quality grass germplasm enhances our living and recreatinnal areas.

Direct contributions

Improved warm-season grass germplasm with greater disease resistance and responsiveness to improved management practices.

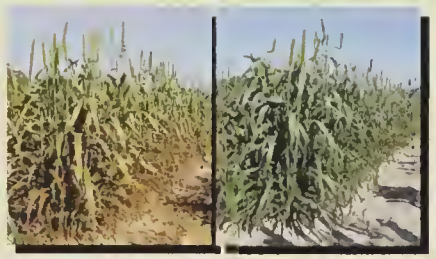
Forage bermudagrasses: Coastal, Coasteross-1, Tifton 44, Tifton 68, Tifton 78, Tifton 85

Turf bermudagrasses: Tifway, Tifgreen Tifdwarf, TifSport, TifEagle

Forage bahiagrass: Tifton 9

Forage pearl millet: Tifleaf 1, Tifleaf 2, Tifleaf 3

Grain pearl millet: HGM 100



Disease resistance maintains high forage quality.

Stand persistence protects the environment and lowers production costs.

Looking to the future, expect:

1. Continued development of superior, warm season grasses for forage and bioenergy.

2. Pearl millet grain hybrids and associated management strategies, to serve the southeastern poultry industry

3. Warm-season grass management strategies to lower production costs while protecting environmental quality

4. Refined breeding strategies to promote durable disease resistance and preserve genetic diversity.

MISSION: Development of Improved Peanut Germplasm with Resistance to Disease and Nematode Pests

C. Corley Holbrook, Crop Genetics and Breeding Research Unit, Tifton, GA

Development of peanut germplasm with resistance to preharvest aflatoxin contamination:

Problem:
Aflatoxin contamination costs the southeast U.S. peanut industry over $ 25 million annually.

Accomplishments:
~Developed field screening techniques which can be used to identify sources of resistance.
~Identified 15 sources of resistance in the U.S. peanut germplasm collection.
~Documented a relationship between improved drought tolerance and reduced aflatoxin.
~Used these sources of resistance in a breeding program to develop resistant cultivars.
~Identified breeding lines with resistance and improved agronomic performance.

Development of peanut germplasm with resistance to the root-knot nematode:

Problem:
The peanut root-knot nematode costs U.S. peanut growers over $ 50 million annually in yield loses and costs of control.

Accomplishments:
~Discovered near immunity to this nematode in related wild species of peanut
~Identified the first know sources of resistance to this nematode in the cultivated peanut species.
~Developed late generation breeding lines with nematode resistance, resistance to tomato spotted wilt virus, and high yield and grade.

Development of improved methods for utilizing the national peanut germplasm collection:

Problem:
Germplasm collections are poorly utilized in breeding programs.

Accomplishments:
~Developed a core collection to represent the U.S. germplasm collection of peanut.
~Documented that this core collection can be used to greatly improve the efficiency of evaluations.
~Resulted in the identification of numerous valuable genes for the following traits:
~Resistance to tomato spotted wilt virus
~Resistance to the peanut root-knot nematode
~Resistance to aflatoxin contamination
~Resistance to early leaf spot
~Resistance to Cylindrocladium Black Rot
~Percent oil
~Fatty acid composition

Barriers to growing profitable corn in the South -- What is USDA-ARS doing to tear them down?

Brian G. Rector and Neil W. Widstrom, USDA-ARS, Crop Genetics and Breeding Research Unit, P.O. Box 748, Tifton, GA 31793

Insect Damage

✓On the Coastal Plain of the southeastern U.S., corn is attacked by insects throughout the growing season.

✓The corn earworm (CEW) and the fall armyworm (FAW) damage young corn plants in the whorl stage, jeopardizing their growth.

✓CEW and FAW reduce marketability of sweet corn by feeding in the developing ear.

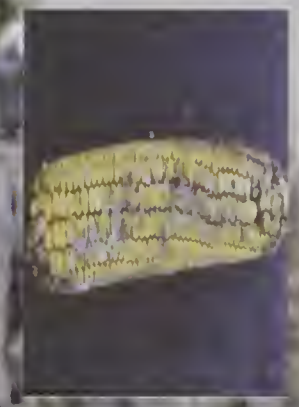
✓CEW and FAW reduce returns on corn grain through yield loss and increased risk of aflatoxin contamination.

Aflatoxin Contamination

✓Aflatoxin is produced in corn kernels by *Aspergillus flavus*, a fungus that causes an ear rot.

✓Aflatoxin contamination dramatically reduces the market value of corn grain and can render it virtually worthless.

✓In a survey of 40 major corn-growing counties in south Ga., the average level of aflatoxin contamination in corn grain exceeded the legal guideline (20 ppb) in 22 of the past 25 years.



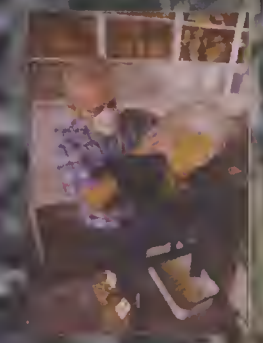
Host-Plant Resistance Research in Maize

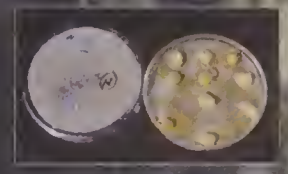
In the Crop Genetics and Breeding Research Unit, we are developing maize germplasm with natural **resistance to CEW and FAW** attack, as well as **resistance to aflatoxin** production by *A. flavus*. This research involves the **screening of germplasm** for sources of resistance genes, **field and laboratory testing** to identify the mechanisms of resistance, **genetics research** to identify the genes responsible for resistance, **plant breeding** to move them into **southern-adapted lines**, and more field and laboratory testing to ensure that the **improved lines** have the desired traits.

Germplasm Screening

Field Testing

Improved, southern-adapted, pest-resistant hybrids





Laboratory Testing

Summary

✓Corn is the primary grass crop in the crop rotation system in Georgia and the southeastern U.S.

✓The strong poultry industry in the region ensures a perenniel demand for clean grain.

✓The Crop Genetics and Breeding Research Unit of USDA-ARS is developing southern-adapted, improved maize germplasm with resistance to insects and aflatoxin to help southern farmers grow corn profitably.

CROP PROTECTION AND MANAGEMENT RESEARCH UNIT

Integration of Alternative Pest Management Strategies for Management of Insects and Aflatoxin Contamination in the Southeastern Coastal Plain

NATIONAL PROGRAMS

301– Plant, Microbial, & Insect Germplasm Conservation & Development

304 –Crop Protection and Quarantine

PROBLEMS

Aflatoxins are naturally occurring, cancer-causing agents produced by fungi when they infect corn and peanut grown in the southeastern U.S. Aflatoxin occurs worldwide, is the most potent cancer-causing agents known, and is associated with increased incidence of liver cancer in humans. In the U.S., corn and feed containing as 5 ppb, even low levels of aflatoxin contamination can prevent peanut and corn export to Europe. Efficient, economical, and environmentally friendly pest management approaches are needed to manage pests and prevent aflatoxin contamination in agricultural crops.

OBJECTIVES

1. Identify resistance to insects, aflatoxin contamination, and drought in corn and peanut.

2. Determine the mechanism of the resistance and transfer the resistance to commercially acceptable lines of peanut and corn.

3. Integrate insect resistance, aflatoxin resistance and drought tolerance in corn and peanut for management of aflatoxin contamination.

APPROACHES

1. Greenhouse, field and laboratory tests to identify corn and peanut lines with resistance to insects, aflatoxin and drought tolerance.

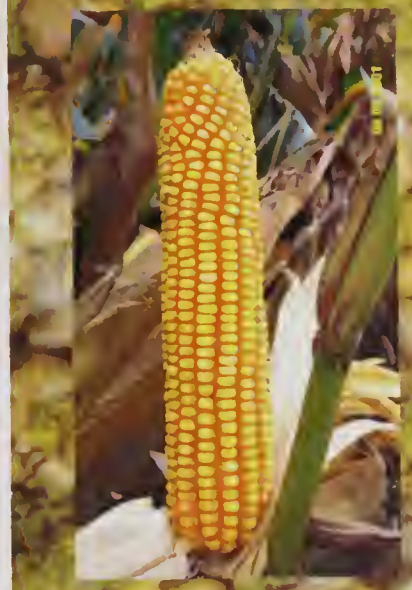
2. Use conventional methods to identify genes associated with the resistance and to develop markers that can be used to identify these genes via breeding programs.

3. Evaluate corn and peanut lines with insect, drought, and aflatoxin resistance in the field for aflatoxin contamination.

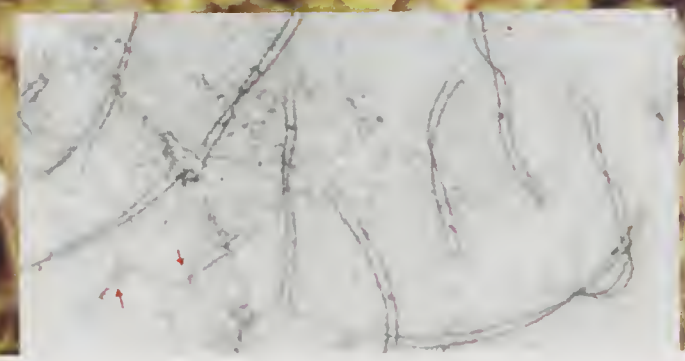
4. Integration of inherited sterility and biological control.

OUTCOMES

- Corn and peanut breeding lines with resistance to insects, drought, and aflatoxin.
- Greater profitability for producers.
- Safer food and feed for consumers and/or livestock.
- Improved competitiveness for U.S. crops in a global market.
- Reduced pesticide use and cleaner environment.



AFLATOXIN CONTAMINATION

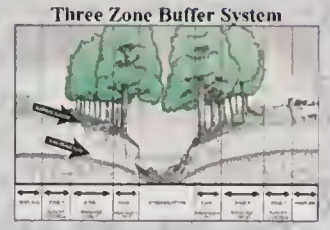


Insect-associated aflatoxin contamination

Drought tolerance in corn

Conservation Buffers for Water Quality Protection in South Georgia Agricultural Watersheds

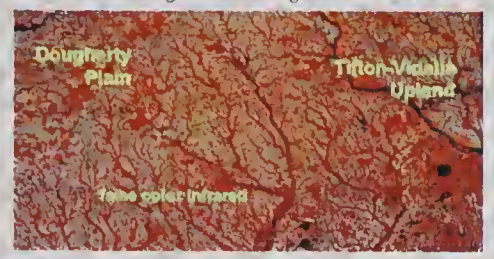
BUFFERS
COMMON-SENSE
CONSERVATION



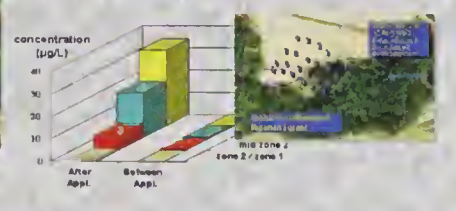
Field Studies of Buffers in the Georgia Coastal Plain

Case Studies in the Coastal Plain

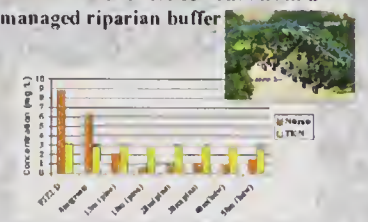
Satellite Image of the Georgia Coastal Plain



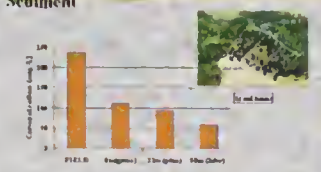
Gibbs Farm:
Atrazinein Surface Runoff



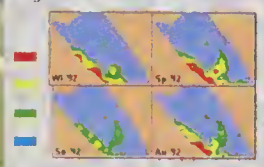
Groundwater N concentrations in a managed riparian buffer



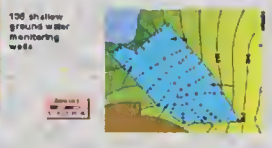
Sediment



Dairy Wetland:
NO_3-N in Ground Water

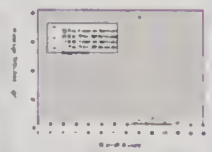


Dairy Wetland:
Monitoring Wells



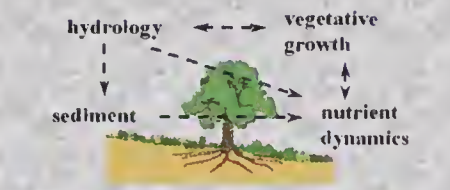
Dairy Wetland:
Restoration Plan

Grass Filters to Reduce Runoff of Cotton Defoliants



Modeling Buffers with the Riparian Ecosystem Management Model

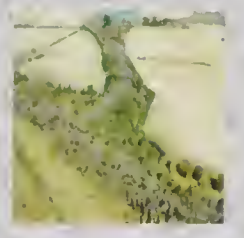
REMM: Components



Web site:
http://sacs.cpes.peachnet.edu/remmwww/

Objectives

Predict how different type buffers perform at reducing nonpoint source

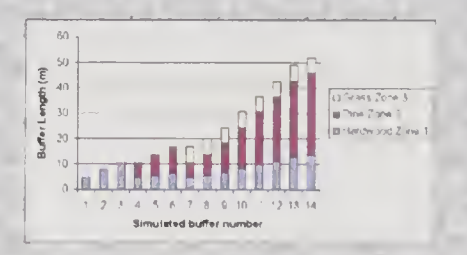


Buffer Scenarios

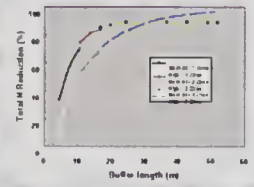
14 buffers ranging from minimum Zone 1 buffer 15 ft to 170 ft three zone buffer

Simulated both conventional row crop loading (normal) and dairy lagoon effluent loading (high).

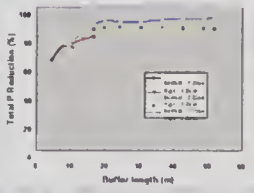
Buffer Scenarios



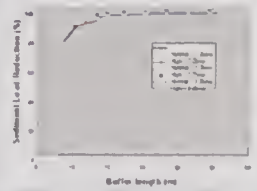
Total N load reduction



Total P load reduction



Sediment Load Reduction



Conclusions

REMM sensitive to hydrologic and nutrient load changes

High load scenario produced similar outputs as normal load for 40-50 m buffers

Vegetation effects were large

Conclusions

Vegetation effects were large

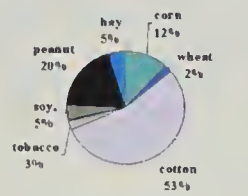
20% increase in total flow caused slight change in sediment transport

TIFTON SEWRL-ARS SCIENTISTS
Tom Potter Tim Strickland
Clint Truman Don Wauchope,
Dave Bosch Richard Lowrance,
Robert Hubbard Joseph Sheridan
COOPERATORS
UGA and UFL faculty
ARS scientists– GA, MS, MD, TX

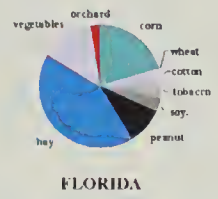
PESTICIDES IN THE COASTAL PLAIN ENVIRONMENT:
COMPARISONS WITH NATIONAL NORMS INDICATE PESTICIDES PRESENT LOWER WATER QUALITY RISKS IN OUR REGION

"The Future Role of Pesticides in U.S. Agriculture"
National Academy of Sciences (2000)
"...No single pest-management strategy will work in all ecosystems. In the foreseeable future chemicals need to be part of an ecologically based framework that can safely increase crop yields..."

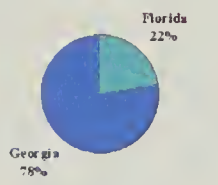
THE SUWANNEE BASIN IS INTENSIVELY FARMED AND PESTICIDE USE IS INTENSE



GEORGIA



FLORIDA



Total agricultural pesticide use in Suwannee Basin (1997) 5.4 * 10⁶ lbs.

Top-ten agricultural pesticides used in Suwannee basin

Pesticide	Class	Tons/yr
1,3-D	Fumigant	516
Chlorothalonil	Fungicide	289
MSMA	Herbicide	139
Sulfur	Fungicide	118
Fluometuron	Herbicide	111
Methyl-bromide	Fumigants	99
Pendimethalin	Herbicide	90
Ethephon	Growth regulator	83
Cyanazine	Herbicide	70
Aldicarb	Nematicide	73

YET MONITORING STUDIES SHOW LITTLE WATER POLLUTION COMPARED TO OTHER REGIONS OF THE USA—WHY?

Suwannee BASIN NAQWA studies:

- **Almost all detections were residues of herbicides used in corn, peanuts, turf and rights-of-way (roadsides, railroads, etc.)**
- **Levels detected were very low (parts per trillion) when compared to mid-Western studies**
- **Data suggest impacts are low but conclusions are limited since only 132 samples were collected in a basin which covers >6 million sq. miles and sampling was not conducted to coincide with times when pesticides are applied**

THE BOTTOM LINE:

- In the absence of research conducted in this region on how pesticides dissipate in the environment, uses allowed will depend on regulatory assumptions heavily weighted by the studies in regions like the mid-Western corn belt. Much more research has been done there.
- Our research has shown that pesticides breakdown more rapidly in the Coastal Plain and that our agriculture is more diverse, i.e. less dependent on a single crop and a few pesticide uses.
- This suggests that water quality risks from pesticide use are lower. Data are needed to support this conclusion.
- *Southeast Watershed Laboratory pesticide research is focused on meeting this need.*

Southeast Watershed Laboratory Research in Progress

- Comprehensive monitoring of pesticide residues in surface water in the Upper Suwannee Basin
- Detailed land use analysis to determine types and amounts of pesticides used
- Field and laboratory studies to determine the rate at which pesticides breakdown after application
- Determining rates at which pesticides runoff as a function of management practices
- Calibration and development of computer-based simulation models to predict pesticide behavior in our environment


"MICROPLOT" RAINFALL SIMULATOR RUNOFF STUDY ON DEFOLIATED COTTON : WE ARE DEVELOPING A NATIONALLY-ACCEPTED APPROACH

Southeast Watershed Research Laboratory

BEST MANAGEMENT PRACTICE RESEARCH

COVER CROPS

Q: DO COVER CROPS PLAY A ROLE IN AGRICULTURAL PRODUCTION IN THE S.E.?

A: YES

COVER CROPS:

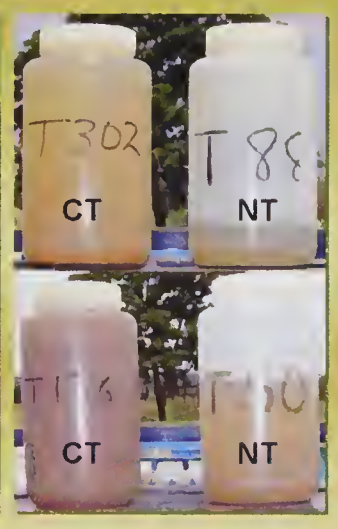
- SUN HEMP
- RYE, RYE GRASS
- WHEAT
- CLOVER

COVER CROPS BENEFITS:

- Reduces weed competition
- Promotes soil OC buildup
- Reduces N leaching to GW
- Can be managed (mowing)
- Can be used in spring or fall.

Cooperators: SFWMD, UF

Providing Solutions to Agricultural Problems

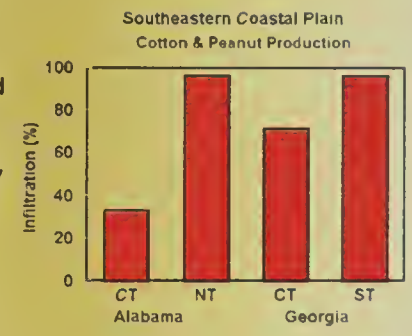


TILLAGE

Q: Can SE Farmers Benefit from Reduced Tillage

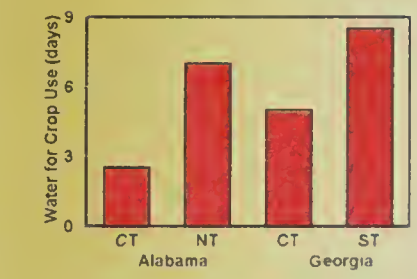
A: YES

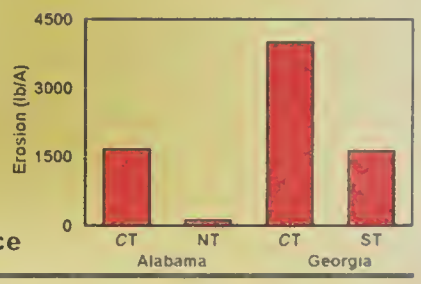
- Reduced till increased Infiltration by 63% (AL) and 25% (GA), resulting in a 3-fold (AL) and 2-fold (GA) increase in days of water for crop use.
- In Alabama, no-till (cotton) reduced soil loss by 1500 lb/A (14-fold).
- In Georgia, strip-till (cotton/peanut rotation) reduced soil loss by 2300 lb/A (2.5-fold).



Bottom line:

Reduced tillage promotes infiltration, increases plant available water, and reduces runoff and erosion. ARS-SEWRL research helps producers maximize water use efficiency by reducing the amount of irrigation needed for crop production, thus increasing a producer's profit margin, while maintaining water supplies and minimizing off-site environmental contamination. Research has directly contributed to the increase in conservation tillage acreage in Georgia since 1998, with acreage expected to double from 2000 to 2001. Similar results have occurred in Alabama.



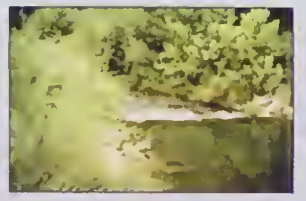


Cooperators: Auburn, UGA, GA Cotton Commission, GA Tillage Alliance

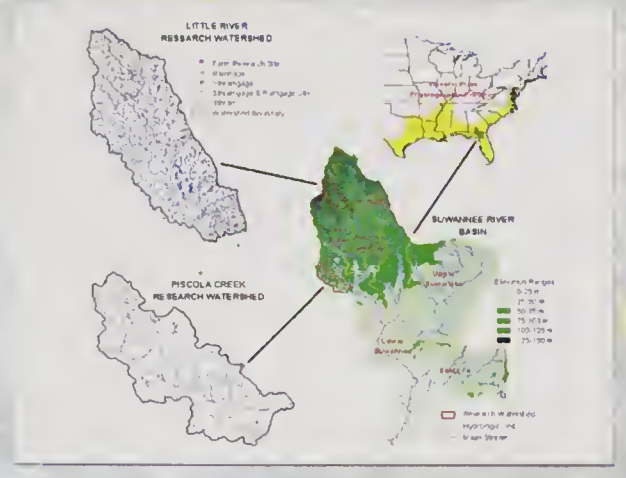
Southeast Watershed Research Laboratory
Project Collaborations

SEWRL partners with the Suwannee River Water Management District, the U.S. Geological Survey, the UGA National Environmentally Sound Production Agriculture Lab, the Florida A&M Center for Water Quality, the UGA Institute of Ecology, and the UGA Department of Biological and Agricultural Engineering to provide one of the oldest and most complete sets of water quantity and quality information in the world.

SEWRL partners with the Natural Resources Conservation Service, other ARS units, the UFL Department of Soil and Water Science, and the Departments of Horticulture, Biological and Agricultural Engineering, and Crop and Soil Science to develop and test improved management practices for coastal plain agriculture



SEWRL has just recently joined the city of Alpharetta, GA and the UGA Griffin Experiment Station in providing realistic estimates of the contributions of urban and golf course runoff to pesticides in surface waters



The SEWRL works at multiple scales with partners having quite varied interests

NRCS Natural Resources Conservation Service

USGS
science for a changing world

Recreation Heritage & Wilderness Resources
USDA Forest Service

Scientists working at SEWRL also serve other Federal and state agencies through service as liaisons and as members of technical advisory boards.

SEWRL partners with the UGA National Environmentally Sound Production Agriculture Lab, NASA, NRCS, and other ARS units to develop real-time linkages between satellite data; aerial photography; and ground-based weather, climate and soil moisture data to enhance water use management.

SEWRL partners with local growers, the UGA Departments of Biological and Agricultural Engineering, Animal and Dairy Science and Poultry Science to develop and test working systems that reduce off-site impacts of animal waste with minimal cost and infrastructure.

Southeast Watershed Research Laboratory

Scientists

David Bosch - Research Hydraulic Engineer

Bob Hubbard - Soil Scientist

Richard Lowrance – Ecologist

Tom Potter - Environmental Research Chemist

Joe Sheridan - Research Hydraulic Engineer

Tim Strickland – Soil Scientist

Clint Truman - Soil Scientist

Don Wauchope - Research Chemist

Vacant – Remote Sensing/Landscape Modeler

Southeast Watershed Research Laboratory

Soil Processes Research

Define controlling relationships between rainfall characteristics, infiltration, runoff, sediment yields, and event-based agrichemical losses from Coastal Plain soils

Define and describe the processes affecting phosphorus and pesticide fate and transport in soil, runoff, foliage and sediments in Coastal Plain agricultural settings

Develop and evaluate a process-based phosphorus index (PI) to assess impacts of land management practices on soil quality and potential phosphorus loadings at the field edge

Develop a "pesticide runoff potential index" which compares the environmental consequences of different pesticides used for the control of the same pest

Southeast Watershed Research Laboratory

Animal Waste Research

Determine the effectiveness of multiple cropping systems in utilizing nutrients from animal wastes and other agricultural effluents

Determine the effectiveness of riparian and other buffer systems in filtering nutrients and microorganisms from animal wastes and other agricultural effluents

Determine the effects of animal wastes and other agricultural effluents in sustainable agricultural systems on water quality in upland and down-slope buffer systems

Southeast Watershed Research Laboratory

Animal Waste Research

Develop technologies to assist in environmentally safe whole farm management of animal waste and other agricultural effluents

Determine amounts, forms and sources of trace contaminants in animal wastes which may limit their utilization as agronomic amendments

Quantify effects of application timing and placement on P fate and transport from benchmark soils after continuous, long-term applications of poultry litter

Southeast Watershed Research Laboratory

Field-to-Watershed Integration Research

Improve the scientific basis for assessing the effects of USDA/state conservation initiatives (CRP, CREPs, EQIP) on water quality and the restoration and sustainability of agricultural landscapes

Develop new concepts and enhance scientific understanding of the role of buffer ecosystems (including wetlands and riparian systems) and agroecosystems (including pastoral and agroforestry systems) within landscapes in processes such as carbon sequestration, aquatic and terrestrial habitat, and materials transport

Southeast Watershed Research Laboratory

Field-to-Watershed Integration Research

Delineate water quality impacts of current conservation buffer management practices and water quality Best Management Practices (BMPs) at field, farm, and watershed scales

Enhance existing models to quantify the impact of buffer systems on water quality (nutrients, sediment, pesticides) at multiple scales and in multiple regions

Link models of pesticide attenuation and dilution in buffer systems with field-scale fate and transport models

Southeast Watershed Research Laboratory

Small-to-Large Watershed Integration Research

Develop and test relationships between geophysical features, agricultural management, and climate, and hydrologic responses for humid region watersheds with low-gradient streams and large riparian storage.

Characterize the water quality of the Little River Watershed, evaluate spatial and temporal water quality trends, and relate water quality to agricultural management, landscape features, and climate.

Evaluate watershed scale natural resource models for their ability to examine the temporal and spatial variability of runoff and water quality in the Coastal Plain Region and provide enhancements for incorporating the effects of shallow subsurface flow, riparian buffers, and the dynamics of low gradient streams and alluvial aquifer systems.

Next Steps

Suwannee Basin Research at the Southeast Watershed Research Laboratory

SEWRL

The Snutheast Watershed Research Laboratory (SEWRL) of the USDA-Agricultural Research Service, Tiftnn, GA, has conducted research on the 334 sq. km Little River Experimental Watershed (LREW) in the South Atlantic Coastal Plain since 1967. The Watershed is in the headwaters of the Suwannee River Watershed, one of 12 National Showcase Watersheds.

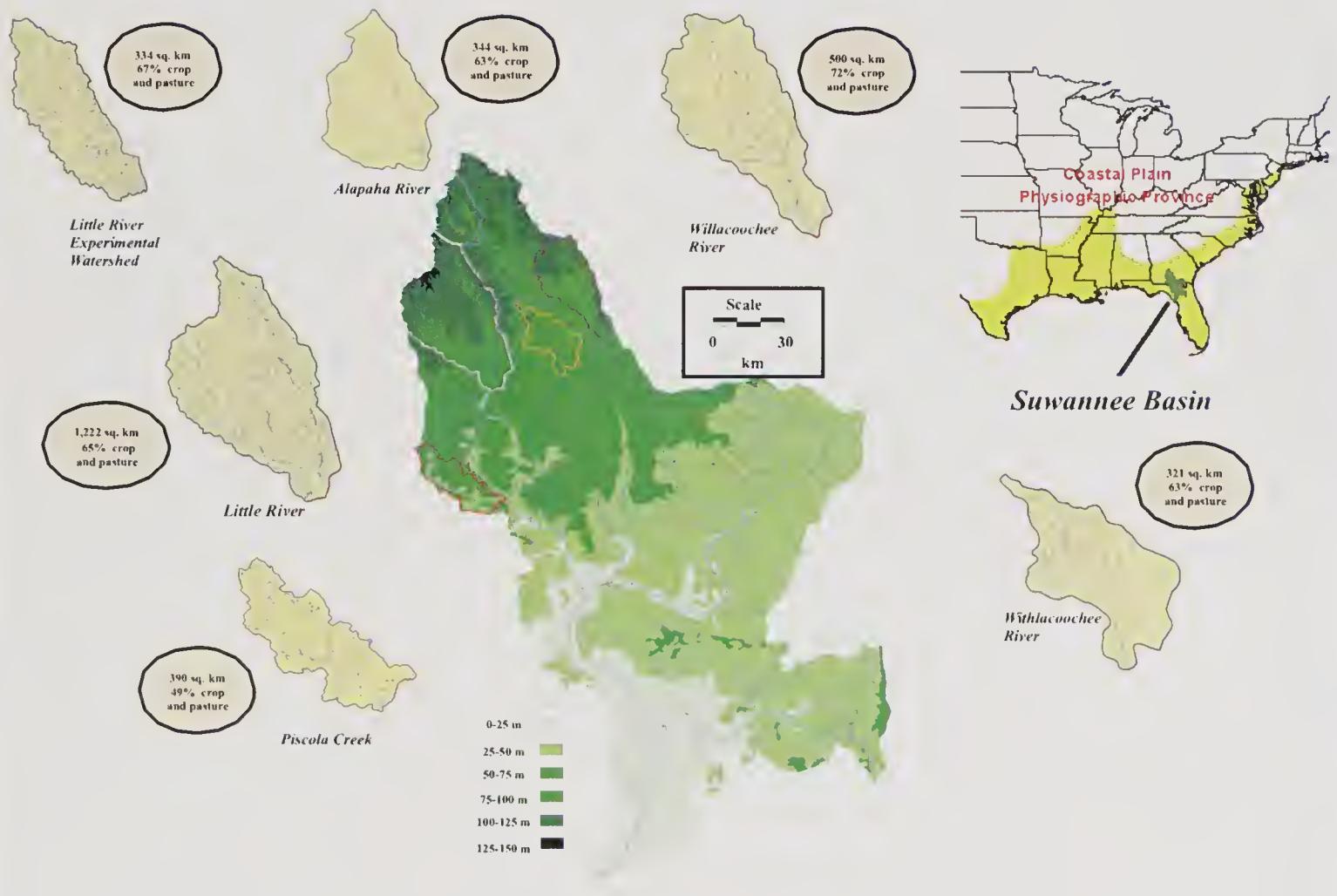
The SEWRL has a 30 yr data base of high quality hydrologic and climatic data. From these data, hydrologic budgets have been developed, the role of alluvial storage defined, climatic and hydrologic means and extremes evaluated, and many tools for watershed modeling developed.

Suwannee Basin

The Suwannee Basin is a National treasure with diverse wildlife, plants, land use, and hydrology. The 25,900 sq. km Basin begins in the Coastal Plain of Georgia, flows through north Florida, and empties into the eastern Gulf of Mexico. The eastern headwaters are primarily in the Okefenokee Swamp. The western headwaters, drained hy the Alapaha, Withlacoochee, and Little Rivers, have fewer wetlands, more agriculture, and more small cities. The Middle and Lower Suwannee River receive major springs and tributary streams emanating from the Floridan aquifer.

Need for Data

Interstate river basins in the Southeastern U.S. are currently subject to negotiations and litigation concerning water use and water quality. The Suwannee Basin has come under increased pressure from development, drought, and competing water uses. Decisions concerning management of interstate basins depend on high quality information on water, land, and human resources. Without dependahle long-term information, stakeholders in the basin cannot make informed decisions regarding resource management.



Proposed Expansion

A partnership has been formed to develop the Basin as an index site of the EPA National Environmental Monitoring and Research Framework. Hydrologic, climatic, and water quality data will be collected. Several watersheds throughout the basin will be studied.

Partners include:
- Southeast Watershed Research Lab
- Suwannee River Water Management District
- University of Georgia
- National Environmentally Sound Production Agriculture Laboratory
- U.S. Geological Survey
- Natural Resource Conservation Service

Our objectives include:
- developing an understanding of natural resource and environmental processes
- providing guidance for optimal use of soil and water resources in the production of quality food and fiber
- developing models and information-based systems to guide responsible watershed management

Expected Benefits

Stakeholders in the basin will benefit from the development of improved farming practices and land use planning tools, increased cooperation among agencies and political institutions, and compatible data sets and models. The states and management agencies within the states will benefit by having a common, integrated data resource on water quantity and quality, land use, and decision support models that draw upon the data resource. Scientific organizations will benefit by having new tools to analyze integrated natural resource issues within the basin.

For further information Contact:

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Research Leader, USDA-ARS, SEWRL
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email: tstrickland@tifton.cpes.peachnet.edu
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Sustainable Pest Management: Using Natures Built-in Tools

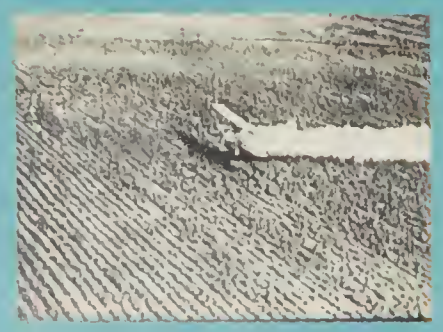
W. Joe Lewis, Glynn Tillman and Dawn Olson

Problem

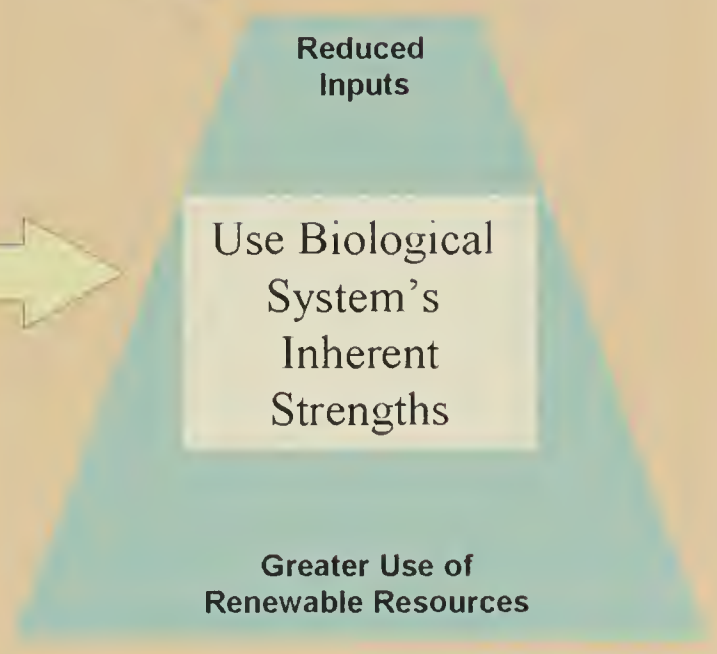
Shift

Negative Impact:

--Diminishing returns on yields despite increase in pesticides.
--Small scale producers can't compete (expensive input- dependence).
--Environmental effects (e.g. erosion, water pollution)
--Social (rural community decline)
--Health concerns (e.g. pesticide residue)



Proposed Solution



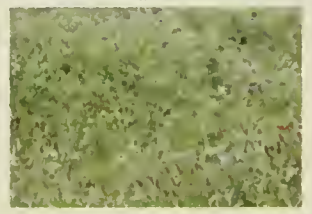
Create perennial/more diverse systems

Understand/manage species interactions: use of natural enemies of pests

Proposed Research:Fostering the Shift

Maximize the Performance of Natural Enemies

Cover crop(s) and management methodology.

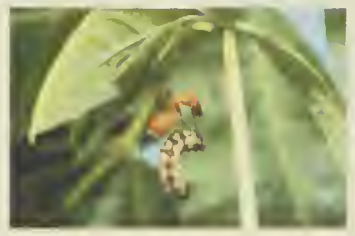


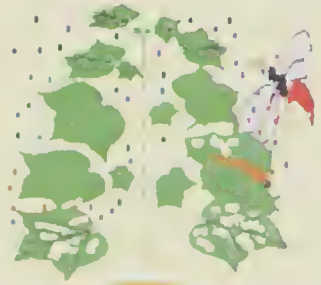
Companion or trap crop combinations.

Use of field edges, neighboring borders and associated vegetation.

Plant characteristics and management practices.

Multi-trophic interactions:focus on behavioral mechanisms





Appendix D – Stakeholder Survey

Although the general format for this listening session is for you to tell us whatever is on your mind, we would very much appreciate your input into some specific topics. Your answers to the following questions would help us in planning research priorities for the future.

1. How can USDA Conservation Programs better serve your needs? In particular, what new technology or information would help the Conservation Programs meet your needs or the needs of farmers in your area?

- Tools to predict the effectiveness of management practices or risk reduction practices. Tools to allow growers to identify and manage the risk that they may have. Landscape overlays that are specific.
- Capture of surface water/runoff - holding pens in reservoirs (collaboration with state, federal, farmer, to build such.
- Acceptance of conservation tillage has been slow in the peanut belt and especially where vegetables are grown. Research is needed to determine if sustainable agriculture can include conservation tillage for vegetables.
- Accurate quantification of sediment and nutrient reductions in runoff that can be achieved through BMPs and costs associated with the BMPs.
- Conduct comparative economic analysis of various systems as it impacts yield, quality, etc., at the farm gate. Farmers want to balance profitability with good environmental stewardship.
- I work in organic agriculture, which is dependent on healthy soils. With so little research yet done for organic farms, the research needs are vast from markets to production issues (on weathered soils in the SE) to post-harvest issues.
- Development and implementation of incentive/cost share programs to encourage farmers and other groups to make changes for improved water quality and improved efficiency in water research use. Cost share and incentives: new innovative approaches to education. Federal and state sources.
- Better publicity of the effects of conservation practices, make "buffer model" available to other agencies/public. Especially economic benefits for farmers (practice adopters).
- How can I get the most economic return on the natural (rainfall) water we receive? Can water be stored or storage capacity be increased in our soils.

- Tie conservation programs to commodity program payments and benefits (green payments) - shores up income support.

2. What genetic characteristics would you like to see plant breeders incorporate into crops such as peanut, corn, forage grasses, turfgrasses, etc? (Be specific for a crop).

- More drought tolerant.
- Water runoff quality, particularly turf and on golf courses (golf courses have higher levels of pesticides and other inputs.)
- TSWV resistant varieties, leaf spot resistant, other disease resistant traits.
- Overall water use efficiency either under rainfall or irrigated situations is the most important emphasis.
- Corn: aflatoxin resistance/tolerance, improved water us efficiency (drought tolerance), disease resistance, insect resistance (natural, not derived from non-plant gene sources). Incorporate them into hybrids (not just germ plasm).
- Natural resistances to common pests particularly in peanuts and corn, but also in vegetable crops. Also cultural characteristics for managing weed pests.
- Water efficiency.
- Peanuts, disease resistance. All crops, drought resistance.
- Peanuts, corn, forage grasses - disease resistance, drought tolerant, more efficient users of water and all nutrients.
- Multiple resistance/drought tolerant peanuts.

3. What are the 5 major threats to the visibility of the peanut industry that research can address?

- Disease, water requirements, weed pressure, new usage, variety (kind - health related)
- Fungicide cancellation - need to develop new ones, foreign competition, water use or lack of implementation of local and state regulation, consumer demand.
- Water use, pesticides, labor cost, skilled workers, energy.
- Aflatoxin, allergy issues, water issues (conservation).
- Allergy issues, aflatoxin, better determination of inputs really needed, water-use efficiency, conservation tillage.
- Need to get going on organic production of peanuts. A variety exists but is not yet marketed. Again, weeds equals major constraint to organic management of peanuts.

- Cost of production and seed, cost of processing and regulatory constraints to improving efficiency.
- Aflatoxin and TSWV and new, high yielding varieties - too many acres of one to two varieties is a problem waiting to happen.
- Aflatoxin.
- Cost of production, aflatoxin, diseases (CBR, TSWV, white mold, etc.), water.
- Water issues, profitability, trade issues, full farm.

4. Would regional climatic, hydrologic and daily rainfall observations coupled with estimates of crop water demands be useful to you?
Yes = 9, No = 1

- Yes, needs to be in easy and understandable format, and able to be input? And part of models.
- Especially consumptive use vs. recharge and surface water vs. groundwater.
- If they go one step farther and are integrated into (and do not duplicate) any other web-based network. Needs: effective precipitation, regional.
- Yes and to all farmers. Crop water demands would need to be broken down by "number of days after planting" categories for crops with along planting season.
- Crop water demands or daily requirements for most economic yield.

5. Do you have plans or do you think farmers in your area have plans to increase irrigated acreage in the next five years. If so, what source of water are you (they) most likely to use - groundwater, surface water impoundments, combination of both?
Yes = 6,No = 4
Combination of both = 2

- Combination of both.
- Irrigation expansion has slowed due to economic situations.
- Would like to increase water use however can't (EPD regulation).
- Yes, but I'm not sure of sources, probably both.
- Some re-orientation of existing. Development of surface water resources enhancement. Expect a combination.
- Groundwater will probably be the dominant source except in areas where it is not available - "Gulf Trough"
- Groundwater.

6. Do you have plans or do you think farmers in your area have plans to increase or decrease animal production in the next five years?
Increase = 7, Decrease = 1
If so, what types of production will increase: beef cattle, hogs, poultry, goats, dairy cows

- About the same.
- Poultry and dairy cows.
- Beef cattle, poultry.
- Increase grass-fed livestock. All that are produced organically or at least with out hormones and antibiotics.
- Depends on national/world markets, just like with crops. If economic benefit to raise animals, more animals will be raised. Infrastructure needs and maintaining that infrastructure needs to be considered. Whatever is likely to make money. Likely: poultry due to integrator approaches to increased production.
- Hogs, poultry
- Beef cattle, goats.
- Beef cattle. An increase of all animal ag is possible in an area - dairy cows may be the least increase.

7. Do you have plans or do you think farmers in your area have plans to increase or decrease overall cropland (row-crops, haylands, and pastures) in the next five years? If so, what crops do you think will be added or removed from production?
Increase = 2, Decrease = 3

- About the same.
- Corn production will be less.
- Only if crop prices increase.
- The continued urban sprawl around Tifton will decrease actual farmed land in our area. High value crops will have to be grown on the remaining cropland.

8. Have you been impacted by pesticide cancellations and how?
Yes: 4, No: 3

- Fire ant control, termite control.
- Higher priced, low effective replacements.
- Methyl bromide, grain fumigant
- Not very much - new products usually take the place of most canceled chemicals.

- In the 1980s.

9. What are your most difficult and costly pest problems, including insects, weeds, nematodes, plant diseases, etc?

- Leaf blot on peanut. Corn earworm on corn and weevils and stink bugs. Cotton, stinkbugs, aphids.
- Weeds and plant diseases.
- Indian meal moths, nematodes, TSWV, thrips
- Depends on year. We must maintain a balance of research on pest control and impact on profits.
- Weeds are a key issue in organic horticulture production.
- Personally - imported fire ants. Weeds are a major problem and species shifts due to RoundUp Ready, etc., are becoming a problem.
- Weed control of pigweed.
- Peanuts: plant diseases, weeds. Cotton: insects, weeds.
- TSWV

10. Would preventative pest management methodology, including processes for fostering greater abundance of beneficial organisms and their effectiveness for reducing the occurrence of pests and costs associated with their controls, be beneficial to you?
Yes = 11, No = 0
What type demonstrations would be needed for farmers to adopt such practices?

- On farm practices.
- On farm demonstration projects.
- Pesticide application methods.
- Field plot demonstrations/other in addition to the Moultrie Expo in Oct. of every year.
- Especially timetables for developing TMDLs and their implementation plans.
- A sustainable whole farm system approach. Demonstrate and highlight research success by implementing results on a large scale.
- On farm so they can see that it works in reality.
- Cost effective, maintain quality and quantity of crop.
- Show cost benefits, i.e., reseeding clover, lower chemical/labor inputs, N from legumes.
- Field days - on farm participation.

- Farm demo.

11. Have you been impacted by water quality legislation or enforcement and how?
Yes = 3, No = 2

- Not yet, but water issues will become much more important as data is gathered.
- Clean Water Act and wetland regulations greatly affect my job (NRCS). TMDL' are an emerging issue with unknown potential impacts on ag.
- Stopped from further development of wells for irrigation.

12. Would you like to be contacted regarding your comments on the questions above? If so, please provide your name and telephone number.

- Elizabeth Leavey, 703-305-7328
- Richard Cuozini, P.O. Box 401, N. Bay Street, Blakely, GA 31723, 229-723-3614
- Carol Kemker, US EPA, 404-562-8975
- Dewey Lee, 220-386-3430
- Deirdre Birmingham, deirdreb@mindspring.com, deirdre@georgiorganics.org, 770-993-5534
- Dan Thomas, 3377
- Hal Simpson, 229-686-2363, ext. 3

OTHER COMMENTS:

- Better integrate efforts from various areas of research (crop genetics, peanut research, SE watershed and crop protection) on water management. Seems to be a number of areas that have potential to help each other (e.g., water holding capacity of soils, disease resistance, irrigation, etc.) Is there coordination of these efforts?

Appendix E – Session Evaluation

1. Was the information provided useful to you as a stakeholder/client of ARS? Yes = 17, No = 2
Comments:

- Learned about ARS projects would have liked more information about results of more projects.
- As a USDA/ARS researcher. Not enough stakeholders here for adequate input. Ratio of stakeholders/ARS too low.
- But needed to hear more from customers and their attendance was very low
- Not applicable - work for ARS.
- As a city council member the chance to express my concerns and have them heard was extremely helpful.
- Somewhat, need more access to all ARS groups.

2. Was the length and format of the workshop appropriate?
Yes = 17, No = 2
If not, please suggest ways we might improve.

- Thought breakout session could have been longer, increase number of stakeholders.
- An optional field demonstration visit would enhance the information exchange.
- More time needed to hear from stakeholders.
- Longer breakout sessions are necessary for stakeholder/customer input.
- More time for breakout sessions.
- Copies of the data presented, e.g., the poster and presentation would have been helpful.

3. Did you think you were given ample opportunity to present your needs and concerns? Yes = 16, No = 2

- I did, but whether others did, I do not know.
- Would like to hear a little more from agriculture (farmers) on what their concerns and needs are.
- Yes, but breakout sessions were a little short.
- There were only two stakeholders in our group. Need to enlist more in future meetings.

4. Would you be interested in participating to subsequent workshops of this type? Yes = 18, No = 0
If so, what would be an appropriate frequency?
Annual = 6, Bi-Annual = 9, Other = 3 (every three years)
Other Comments:

- Excellent forum, need to work to get more stakeholders involved next time, but very good first time effort.
- Expand number of stakeholders, include minor crops, water district managers, seed industry, major growers in SE Atlanta Region environmental groups, other parts of USDA and other federal. State and local agencies.
- Agriculture is driven by economic incentive. A well conceived profitable system at agricultural production with backup support will move into mainstream agriculture.
- Communication is the key-sharing of information between USDA researchers and University of Georgia Researchers (Auburn, Florida, N.C. State, Texas A&M, Va. Tech and UGA).
- Future meetings may focus on specific issues sooner. (e.g., longer time for breakouts and opportunity to participate in more than one).
- Invite county agents, more farmers and other station professionals.
- Where were the stakeholders/customers? This was mainly a 'preaching to the choir' session. Future such sessions must be widely publicized, not just inviting selected stakeholders/customers.
- Need to demonstrate to customers that their input in these activities is having an impact.
- Invite other stakeholders: consumers, local officials (county), processing industry, environmental groups.
- When new information, concerns, etc., are available, probably more than annual. Will copies of the presentations given on Friday AM be available, possibly via e-mail distribution list. (Dick Chalfant - wants copies of presentation).
- Bring in "compatible" ARS groups across the southeast region. Benefit to stakeholders and ARS. Comment on result from different labs/units and similar needs/initiatives were mentioned from at least three o the groups (new crops needed, better management of water related to crops, etc.). How are budgets, priorities, personnel, projects being managed for improved efficiency "between" units?